

AMAZING STORIES

The cover features a detailed illustration of a large, yellow dirigible with a red and white striped balloon attached to its side. The dirigible is angled upwards towards the right, with its tail section visible. The balloon has a red and white striped pattern and a dark, circular opening at its base. The background is a dark blue night sky filled with numerous small white stars. The overall style is reminiscent of classic pulp magazine covers from the 1930s.

October 1936
25 Cents

UNCERTAINTY

by John W. Campbell Jr.

W. K. SONNEMANN

LESLIE F. STONE



**DO WE HAVE
TO ASK PAUL—
HE LOOKS
SO TERRIBLE**

**THE
GIRLS WERE
GIVING
PAUL THE
"GO-BY"
UNTIL—**

WE REALLY OUGHT
TO HAVE ASKED PAUL
TO COME — BUT —

I KNOW — HE'S GOT
SUCH AN AWFUL LOT
OF HICKIES YOU
SORT OF DON'T
WANT TO SEE
HIM —



OH, GOODY — HERE'S
PAUL — PAUL, CAN
WE FISH WITH YOU?

PAUL, WHY
DIDN'T
YOU GO
OUT IN
THE BOAT?

OH — I DUN NO—
WASN'T ROOM
ENOUGH FOR
ME, I GUESS



BUT PAUL—
DORA SAID
SHE WAS
GOING TO
ASK YOU,
I HEARD
HER

YES — AND
THEN SHE
SAID YOU
HAD HICKIES—
WHAT ARE
HICKIES, PAUL?

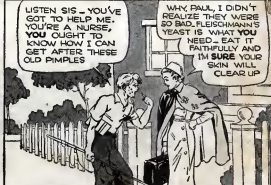
WELL I'LL BE
JIGGERED —

SO THAT'S
WAY I'VE
BEEN SITTING
AROUND WITH
ONLY MYSELF
FOR COMPANY!



LISTEN SIS — YOU'VE
GOT TO HELP ME.
YOU'RE A NURSE,
YOU OUGHT TO
KNOW HOW I CAN
GET AFTER THESE
OLD PIMPLES

WHY, PAUL, I DIDN'T
REALIZE THEY WERE
SO BAD. FLEISCHMANN'S
YEAST IS WHAT YOU
NEED — EAT IT
FAITHFULLY AND
I'M SURE YOUR
SKIN WILL
CLEAR UP



LATER

ATTA BOY — PAUL
SURE IS ALL THE
RAGE AROUND HERE
THESE DAYS

WELL — HE'S CERTAINLY
A DIFFERENT LOOKING
BOY SINCE HE
GOT RID OF THOSE
UGLY HICKIES



**Don't let Adolescent Pimples put
a stop to YOUR good times**

YOUNG PEOPLE are often plagued by unsightly pimples after the start of adolescence—from about 13 to 25, or longer.

Important glands develop at this time, and final growth takes place causing disturbances in the body. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin—and pimples break out!

Fleischmann's fresh Yeast clears these skin irritants out of the blood. Then, the pimples go. Eat 3 cakes *daily*—one about $\frac{1}{2}$ hour before meals—plain, or dissolved in a little water—until your skin clears. Start today!



—clears the skin

by clearing skin irritants
out of the blood

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Illinois**

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\$1800 While
Learning**



"I picked up \$1800 while studying and I call that easy money—the day I saw my Radio work did not interfere with my other business." **OTIS DENTON, 14106 Lorain Avenue, Cleveland, Ohio.**



**Made up to
\$400
a Month**

"I was working in a garage with no future in sight. My wife and I decided to put aside enough to pay for your Course. We have not regretted it. I have made as high as \$400 a month in Radio." **E. G. WOLFE, 1202 Eden St., Elkhart, Ind.**

**The Tested Way
to BETTER PAY**

Clip the coupon and mail it. I will prove to you that I can train you at home in your spare time to be a **RADIO EXPERT**. I will send you my first lesson **FREE**. Examine it, read it, see how clear and easy it is to understand—how practical I make learning Radio at home. Then you will know why men without Radio or electrical experience have become Radio Experts and are earning more money than ever as a result of my Training.

Many Radio Experts Make \$30, \$50, \$75 a Week

Radio broadcasting stations employ engineers, operators, station managers and pay up to \$5,000 a year. Spare time Radio set servicing pays as much as \$300 to \$500 a year—full time jobs with Radio jobbers, manufacturers and dealers as much as \$30, \$50, \$75 a week. Many Radio Experts operate their own full time or part time Radio sales and service businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to \$6,000 a year. Radio operators on ships get good pay and see the world besides. Automobile, police, aviation, commercial Radio, and loud speaker systems are newer fields offering good opportunities now and for the future. Television promises to open many good jobs soon. Men I have trained are holding good jobs in these branches of Radio. Read their statements. Mail the coupon.

There's a Real Future in Radio for Well Trained Men

Radio already gives jobs to more than 300,000 people. In 1935 over \$300,000,000 worth of sets, tubes and parts were sold—an increase of 25% over 1934. Over 1,100,000 auto Radios were sold in 1935, 25% more than in 1934. 22,000,000 homes are today equipped with Radios, and every year millions of these sets go out of date and are replaced with newer models. Millions more need servicing, new tubes, repairs, etc. Broadcasting stations pay their employees (exclusive of artists) more than \$25,000 a year! And Radio is a new industry, still growing fast! A few hundred \$30, \$50, \$75-a-week jobs have grown to many thousands in less than 20 years.

Many Make \$5, \$10, \$15 a Week Extra in Spare Time While Learning

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I Give You Practical Experience

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installations. I show you how to build testing apparatus for use in spare time work from this equipment. Read about this 60-90 method of training—how it makes learning at home interesting, quick, fascinating, practical. Mail coupon.

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I am so sure that I can train you successfully that I agree in writing to refund every penny you pay me if you are not satisfied with my Lessons and Instruction Service when you finish. I'll send you a copy of this agreement with my Free Book.

Find Out What Radio Offers You
Mail coupon for sample lesson and 64-page book. Both are free to anyone over 16 years old. My book describes Radio's spare time and full time opportunities and those coming in Television. It tells about my training in Radio and Television shows you actual letters from men I have trained, telling what they are doing and earning. Find out what Radio offers YOU! MAIL THE COUPON in an envelope, or paste it on a penny post card—NOW!

**J. E. SMITH, President, Dept. 63M
National Radio Institute, Washington, D. C.**

**MAIL
COUPON
NOW!**



**GOOD FOR BOTH 64 PAGE BOOK FREE
SAMPLE LESSON**

**J. E. SMITH, President, Dept. 63M
National Radio Institute, Washington, D. C.**

Dear Mr. Smith: Without obligating me, send the sample lesson and your book which tells about the spare time and full time opportunities in Radio and explains your 60-90 method of training men at home in spare time to become Radio Experts. (Please write plainly.)

NAME _____ AGE _____

ADDRESS _____

CITY _____ STATE _____

AMAZING STORIES

Science Fiction

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OCTOBER, 1936

No. 12

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Illustration

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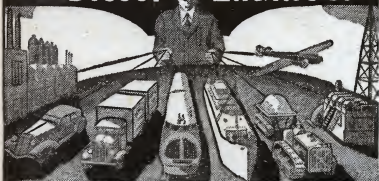
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28x4-40-21	4.50	.85	
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28x4-40-21	9.75	.85	
28x4-40-21	9.80	.85	
28x4-40-21	9.85	.85	
28x4-40-21	9.90	.85	
28x4-40-21	9.95	.85	
28x4-40-21	10.00	.85	

CORD TIRES

Size	Tire	Tube	Size	Tire	Tube
30x3-16	\$2.00	\$0.75	30x3-16	\$3.35	\$1.15
30x3-16	2.10	.75	30x3-16	3.45	1.15
30x3-16	2.20	.75	30x3-16	3.55	1.15
30x3-16	2.30	.75	30x3-16	3.65	1.15
30x3-16	2.40	.75	30x3-16	3.75	1.15
30x3-16	2.50	.75	30x3-16	3.85	1.15
30x3-16	2.60	.75	30x3-16	3.95	1.15
30x3-16	2.70	.75	30x3-16	4.05	1.15
30x3-16	2.80	.75	30x3-16	4.15	1.15
30x3-16	2.90	.75	30x3-16	4.25	1.15
30x3-16	3.00	.75	30x3-16	4.35	1.15
30x3-16	3.10	.75	30x3-16	4.45	1.15
30x3-16	3.20	.75	30x3-16	4.55	1.15
30x3-16	3.30	.75	30x3-16	4.65	1.15
30x3-16	3.40	.75	30x3-16	4.75	1.15
30x3-16	3.50	.75	30x3-16	4.85	1.15
30x3-16	3.60	.75	30x3-16	4.95	1.15
30x3-16	3.70	.75	30x3-16	5.05	1.15
30x3-16	3.80	.75	30x3-16	5.15	1.15
30x3-16	3.90	.75	30x3-16	5.25	1.15
30x3-16	4.00	.75	30x3-16	5.35	1.15
30x3-16	4.10	.75	30x3-16	5.45	1.15
30x3-16	4.20	.75	30x3-16	5.55	1.15
30x3-16	4.30	.75	30x3-16	5.65	1.15
30x3-16	4.40	.75	30x3-16	5.75	1.15
30x3-16	4.50	.75	30x3-16	5.85	1.15
30x3-16	4.60	.75	30x3-16	5.95	1.15
30x3-16	4.70	.75	30x3-16	6.05	1.15
30x3-16	4.80	.75	30x3-16	6.15	1.15
30x3-16	4.90	.75	30x3-16	6.25	1.15
30x3-16	5.00	.75	30x3-16	6.35	1.15
30x3-16	5.10	.75	30x3-16	6.45	1.15
30x3-16	5.20	.75	30x3-16	6.55	1.15
30x3-16	5.30	.75	30x3-16	6.65	1.15
30x3-16	5.40	.75	30x3-16	6.75	1.15
30x3-16	5.50	.75	30x3-16	6.85	1.15
30x3-16	5.60	.75	30x3-16	6.95	1.15
30x3-16	5.70	.75	30x3-16	7.05	1.15
30x3-16	5.80	.75	30x3-16	7.15	1.15
30x3-16	5.90	.75	30x3-16	7.25	1.15
30x3-16	6.00	.75	30x3-16	7.35	1.15
30x3-16	6.10	.75	30x3-16	7.45	1.15
30x3-16	6.20	.75	30x3-16	7.55	1.15
30x3-16	6.30	.75	30x3-16	7.65	1.15
30x3-16	6.40	.75	30x3-16	7.75	1.15
30x3-16	6.50	.75	30x3-16	7.85	1.15
30x3-16	6.60	.75	30x3-16	7.95	1.15
30x3-16	6.70	.75	30x3-16	8.05	1.15
30x3-16	6.80	.75	30x3-16	8.15	1.15
30x3-16	6.90	.75	30x3-16	8.25	1.15
30x3-16	7.00	.75	30x3-16	8.35	1.15
30x3-16	7.10	.75	30x3-16	8.45	1.15
30x3-16	7.20	.75	30x3-16	8.55	1.15
30x3-16	7.30	.75	30x3-16	8.65	1.15
30x3-16	7.40	.75	30x3-16	8.75	1.15
30x3-16	7.50	.75	30x3-16	8.85	1.15
30x3-16	7.60	.75	30x3-16	8.95	1.15
30x3-16	7.70	.75	30x3-16	9.05	1.15
30x3-16	7.80	.75	30x3-16	9.15	1.15
30x3-16	7.90	.75	30x3-16	9.25	1.15
30x3-16	8.00	.75	30x3-16	9.35	1.15
30x3-16	8.10	.75	30x3-16	9.45	1.15
30x3-16	8.20	.75	30x3-16	9.55	1.15
30x3-16	8.30	.75	30x3-16	9.65	1.15
30x3-16	8.40	.75	30x3-16	9.75	1.15
30x3-16	8.50	.75	30x3-16	9.85	1.15
30x3-16	8.60	.75	30x3-16	9.95	1.15
30x3-16	8.70	.75	30x3-16	10.05	1.15
30x3-16	8.80	.75	30x3-16	10.15	1.15
30x3-16	8.90	.75	30x3-16	10.25	1.15
30x3-16	9.00	.75	30x3-16	10.35	1.15
30x3-16	9.10	.75	30x3-16	10.45	1.15
30x3-16	9.20	.75	30x3-16	10.55	1.15
30x3-16	9.30	.75	30x3-16	10.65	1.15
30x3-16	9.40	.75	30x3-16	10.75	1.15
30x3-16	9.50	.75	30x3-16	10.85	1.15
30x3-16	9.60	.75	30x3-16	10.95	1.15
30x3-16	9.70	.75	30x3-16	11.05	1.15
30x3-16	9.80	.75	30x3-16	11.15	1.15
30x3-16	9.90	.75	30x3-16	11.25	1.15
30x3-16	10.00	.75	30x3-16	11.35	1.15
30x3-16	10.10	.75	30x3-16	11.45	1.15
30x3-16	10.20	.75	30x3-16	11.55	1.15
30x3-16	10.30	.75	30x3-16	11.65	1.15
30x3-16	10.40	.75	30x3-16	11.75	1.15
30x3-16	10.50	.75	30x3-16	11.85	1.15
30x3-16	10.60	.75	30x3-16	11.95	1.15
30x3-16	10.70	.75	30x3-16	12.05	1.15
30x3-16	10.80	.75	30x3-16	12.15	1.15
30x3-16	10.90	.75	30x3-16	12.25	1.15
30x3-16	11.00	.75	30x3-16	12.35	1.15
30x3-16	11.10	.75	30x3-16	12.45	1.15
30x3-16	11.20	.75	30x3-16	12.55	1.15
30x3-16	11.30	.75	30x3-16	12.65	1.15

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Balloons	
Size	Tires Tubes
28x4-59-18	\$1.55 \$0.85
28x4-59-20	1.65 1.00
28x4-59-22	1.75 1.10
28x4-59-24	1.85 1.20
28x4-59-26	1.95 1.30
28x4-59-28	2.10 1.40
28x4-59-30	2.20 1.50
28x4-59-32	2.30 1.60
28x4-59-34	2.40 1.70
28x4-59-36	2.50 1.80
28x4-59-38	2.60 1.90
28x4-59-40	2.70 2.00
28x4-59-42	2.80 2.10
28x4-59-44	2.90 2.20
28x4-59-46	3.00 2.30
28x4-59-48	3.10 2.40
28x4-59-50	3.20 2.50
28x4-59-52	3.30 2.60
28x4-59-54	3.40 2.70
28x4-59-56	3.50 2.80
28x4-59-58	3.60 2.90
28x4-59-60	3.70 3.00
28x4-59-62	3.80 3.10
28x4-59-64	3.90 3.20
28x4-59-66	4.00 3.30
28x4-59-68	4.10 3.40
28x4-59-70	4.20 3.50
28x4-59-72	4.30 3.60
28x4-59-74	4.40 3.70
28x4-59-76	4.50 3.80
28x4-59-78	4.60 3.90
28x4-59-80	4.70 4.00
28x4-59-82	4.80 4.10
28x4-59-84	4.90 4.20
28x4-59-86	5.00 4.30
28x4-59-88	5.10 4.40
28x4-59-90	5.20 4.50
28x4-59-92	5.30 4.60
28x4-59-94	5.40 4.70
28x4-59-96	5.50 4.80
28x4-59-98	5.60 4.90
28x4-59-100	5.70 5.00
TRUCK TIRES	
Size	Tires Tubes
30x4-59	\$3.50 \$1.00
30x4-61	3.75 1.10
30x4-63	4.00 1.20
30x4-65	4.25 1.30
30x4-67	4.50 1.40
30x4-69	4.75 1.50
30x4-71	5.00 1.60
30x4-73	5.25 1.70
30x4-75	5.50 1.80
30x4-77	5.75 1.90
30x4-79	6.00 2.00
30x4-81	6.25 2.10
30x4-83	6.50 2.20
30x4-85	6.75 2.30
30x4-87	7.00 2.40
30x4-89	7.25 2.50
30x4-91	7.50 2.60
30x4-93	7.75 2.70
30x4-95	8.00 2.80
30x4-97	8.25 2.90
30x4-99	8.50 3.00
30x4-101	8.75 3.10
30x4-103	9.00 3.20
30x4-105	9.25 3.30
30x4-107	9.50 3.40
30x4-109	9.75 3.50
30x4-111	10.00 3.60
30x4-113	10.25 3.70
30x4-115	10.50 3.80
30x4-117	10.75 3.90
30x4-119	11.00 4.00
30x4-121	11.25 4.10
30x4-123	11.50 4.20
30x4-125	11.75 4.30
30x4-127	12.00 4.40
30x4-129	12.25 4.50
30x4-131	12.50 4.60
30x4-133	12.75 4.70
30x4-135	13.00 4.80
30x4-137	13.25 4.90
30x4-139	13.50 5.00
30x4-141	13.75 5.10
30x4-143	14.00 5.20
30x4-145	14.25 5.30
30x4-147	14.50 5.40
30x4-149	14.75 5.50
30x4-151	15.00 5.60
30x4-153	15.25 5.70
30x4-155	15.50 5.80
30x4-157	15.75 5.90
30x4-159	16.00 6.00
30x4-161	16.25 6.10
30x4-163	16.50 6.20
30x4-165	16.75 6.30
30x4-167	17.00 6.40
30x4-169	17.25 6.50
30x4-171	17.50 6.60
30x4-173	17.75 6.70
30x4-175	18.00 6.80
30x4-177	18.25 6.90
30x4-179	18.50 7.00
30x4-181	18.75 7.10
30x4-183	19.00 7.20
30x4-185	19.25 7.30
30x4-187	19.50 7.40
30x4-189	19.75 7.50
30x4-191	20.00 7.60
30x4-193	20.25 7.70
30x4-195	20.50 7.80
30x4-197	20.75 7.90
30x4-199	21.00 8.00
30x4-201	21.25 8.10
30x4-203	21.50 8.20
30x4-205	21.75 8.30
30x4-207	22.00 8.40
30x4-209	22.25 8.50
30x4-211	22.50 8.60
30x4-213	22.75 8.70
30x4-215	23.00 8.80
30x4-217	23.25 8.90
30x4-219	23.50 9.00
30x4-221	23.75 9.10
30x4-223	24.00 9.20
30x4-225	24.25 9.30
30x4-227	24.50 9.40
30x4-229	24.75 9.50
30x4-231	25.00 9.60
30x4-233	25.25 9.70
30x4-235	25.50 9.80
30x4-237	25.75 9.90
30x4-239	26.00 10.00
30x4-241	26.25 10.10
30x4-243	26.50 10.20
30x4-245	26.75 10.30
30x4-247	27.00 10.40
30x4-249	27.25 10.50
30x4-251	27.50 10.60
30x4-253	27.75 10.70
30x4-255	28.00 10.80
30x4-257	28.25 10.90
30x4-259	28.50 11.00
30x4-261	28.75 11.10
30x4-263	29.00 11.20
30x4-265	29.25 11.30
30x4-267	29.50 11.40
30x4-269	29.75 11.50
30x4-271	30.00 11.60
30x4-273	30.25 11.70
30x4-275	30.50 11.80
30x4-277	30.75 11.90
30x4-279	31.00 12.00
30x4-281	31.25 12.10
30x4-283	31.50 12.20
30x4-285	31.75 12.30
30x4-287	32.00 12.40
30x4-289	32.25 12.50
30x4-291	32.50 12.60
30x4-293	32.75 12.70
30x4-295	33.00 12.80
30x4-297	33.25 12.90
30x4-299	33.50 13.00
30x4-301	33.75 13.10
30x4-303	34.00 13.20
30x4-305	34.25 13.30
30x4-307	34.50 13.40
30x4-309	34.75 13.50
30x4-311	35.00 13.60
30x4-313	35.25 13.70
30x4-315	35.50 13.80
30x4-317	35.75 13.90
30x4-319	36.00 14.00
30x4-321	36.25 14.10
30x4-323	36.50 14.20
30x4-325	36.75 14.30
30x4-327	37.00 14.40
30x4-329	37.25 14.50
30x4-331	37.50 14.60
30x4-333	37.75 14.70
30x4-335	38.00 14.80
30x4-337	38.25 14.90
30x4-339	38.50 15.00
30x4-341	38.75 15.10
30x4-343	39.00 15.20
30x4-345	39.25 15.30
30x4-347	39.50 15.40
30x4-349	39.75 15.50
30x4-351	40.00 15.60
30x4-353	40.25 15.70
30x4-355	40.50 15.80
30x4-357	40.75 15.90
30x4-359	41.00 16.00
30x4-361	41.25 16.10
30x4-363	41.50 16.20
30x4-365	41.75 16.30
30x4-367	42.00 16.40
30x4-369	42.25 16.50
30x4-371	42.50 16.60
30x4-373	42.75 16.70
30x4-375	43.00 16.80
30x4-377	43.25 16.90
30x4-379	43.50 17.00
30x4-381	43.75 17.10
30x4-383	44.00 17.20
30x4-385	44.25 17.30
30x4-387	44.50 17.40
30x4-389	44.75 17.50
30x4-391	45.00 17.60
30x4-393	45.25 17.70
30x4-395	45.50 17.80
30x4-397	45.75 17.90
30x4-399	46.00 18.00
30x4-401	46.25 18.10
30x4-403	46.50 18.20
30x4-405	46.75 18.30
30x4-407	47.00 18.40
30x4-409	47.25 18.50
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30x4-413	47.75 18.70
30x4-415	48.00 18.80
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30x4-419	48.50 19.00
30x4-421	48.75 19.10
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30x4-429	49.75 19.50
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30x4-435	50.50 19.80
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30x4-475	55.50 21.80
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30x4-615	73.00 28.80
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30x4-695	83.00 32.80
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30x4-699	83.50 33.00
30x4-701	83.75 33.10
30x4-703	84.00 33.20
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30x4-707	84.50 33.40
30x4-709	84.75 33.50
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30x4-713	85.25 33.70
30x4-715	85.50 33.80
30x4-717	85.75 33.90
30x4-719	86.00 34.00
30x4-721	86.25 34.10
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Extravagant Fiction To-day Cold Fact To-morrow

Analysis and Synthesis

By T. O'CONOR SLOANE, Ph. D.

THE word analysis, which has played so large a part in the vocabulary of chemistry in the last century and a half, is derived from the Greek. It means unbinding or setting free. In our English language vocabulary we use a somewhat undignified word, which comes very close to it. We speak often of untangling a statement, where if we wanted to be more dignified we would say analysing.

An analysis may cover the correct definition of what takes place in any action. Recently the long credited belief that a heavy body would fall quicker than a light one was based on what was supposed to be an accurate analysis of the phenomena of falling bodies. It was believed that the heavier body was pushed down more forcibly than the lighter one, and so far the analysis was exactly true. But it was an incomplete bit of reasoning. The incompleteness was in overlooking the fact that the force required to

start a heavy body into motion and accelerate it was greater than that required for a light one. The throwing of a stone is a case where velocity of motion has to be imparted. It is obvious that the lighter stone will go further than the heavier one, because greater velocity is imparted to it by the thrower. There are subsidiary forces and resistances which come into the problem, but let anyone throw two stones, one weighing a pound and the other one weighing one hundred pounds and see which one will go the further before reaching the end of its course on mother earth.

Now suppose the two were dropped from a height, which of the two would reach the ground first? For long generations of humanity it was believed that the heavier stone being pulled down by a weight of a hundred pounds would fall the faster. Nearly two thousand years after the days of Plato, of Aristotle, it occurred to Galileo to

try if this was true by dropping a heavy and a light stone from the same height. Of course they fell at about the same velocity, the heavier one reaching the ground a very slight amount in advance of the smaller, but the difference, due to the resistance of the air, was trivial. The belief of centuries of philosophers was disproved in the time it took two stones to fall from the Leaning Tower of Pisa.

There is not the least doubt that analysis had been applied to the problem of falling bodies, but the analysis was incomplete. We may wonder if Galileo had a correct analysis of the case in his mind. The easier way was to try it. There is a theory that direct experiment to unravel the laws of nature was undignified in the view of old time philosophers. They thought that the laws of nature should be unravelled by pure intellect. Sir Isaac Newton formulated the law stating the effect of force on matter as affecting its motion. To impart a velocity of a given amount to a body of twice the weight of another, would require twice the force. This is a sort of analysis of the law of falling bodies. The weight of the heavier body gives at once twice the force and twice the resistance. This may be called an analysis of the law of falling bodies. A pound of matter is pulled twice as hard by gravity as a half pound. But it took centuries for mankind to find what that led to. If they had had Van Guericke's air pump they could have tried the experiment of the coin and feather falling with equal speed in an air-exhausted tube. But the world had to wait centuries for the air-pump.

Sometimes it seems curious how investigators and students of natural science shrank from drawing conclusions from the most obvious phenomena. One of the simplest chemical

experiments is the decomposition of water by electric action. This is a basic experiment in chemical analysis. It shows that water can be decomposed into two gases. One is oxygen, the other is hydrogen. There is twice the volume of hydrogen that there is of oxygen. What would be more simple than to see in this experiment that the formula of water should be written as H_2O . This expresses the fact that there are in the molecule of water two atoms of hydrogen and one of oxygen, but many of the old time chemists never accepted what the decomposition seemed to express. The decomposition of water by the electric current is one of the best and simplest examples of a chemical analysis, the unbinding of water molecules. As it is based on the volume of the gases evolved it may be taken as an example of volumetric analysis.

So beyond the 'sixties of the last century many of the older chemists refused to accept the above formula of water but persisted in calling it HO . The old School of Mines of Columbia College, it was not a University then, kept to the old system of chemical symbols for some time after its founding. Finally a resolution of the Board was passed adopting the "New System" as it was first called. It was a matter of great difficulty for those who had been inculcated with the old system to assimilate and work under the new. The affair threatened in some cases to assume a sort of personal aspect.

In the chemical laboratory analysis takes the most varied aspects. It may be done by weighing the products obtained in the work, or the volumes of reagents required to effect definite chemical changes may be determined. The first is gravimetric analysis, the other is volumetric analysis. It will be

understood that the above is a very incomplete presentation of the subject, which in its details is not exactly endless, but may attain any degree of complication.

In plant life there is an analysis; the living plant absorbs water but has no use for oxygen. The carbon dioxide of the air is a chemical compound of carbon and oxygen. Carbon we are familiar with as lampblack, an approximation to pure carbon, and as the diamond, the latter in every respect the opposite of carbon yet chemically the same. The plant has no affinity for the other constituent of carbon dioxide. We may fill a bottle with water and introduce a quantity of green leaves into it, close its mouth with the hand, and invert it in a vessel of water. If this is rightly done there will not be a particle of air in the inverted bottle. Now leave it in the sun and analysis will take place; pure oxygen gas will be evolved by the leaves, and after a few hours the gas will begin to be seen in the upper part of the inverted bottle. This is oxygen gas produced by a chemical decomposition, so that the plant actually performs an analysis.

The word analysis, setting free or unbinding it may be rendered, has a very wide application. We may speak of unravelling the threads of an argument. This is an analysis of what has been put before us.

The separation of carbon dioxide gas into its two constituents, carbon and oxygen gas was considered quite a problem in chemistry. It was very simple to reduce it to carbon monoxide, one of the gases present in the exhaust of automobiles, which has been responsible for a number of deaths. But to get the full separation into oxygen and carbon is in the difficult order of things. And the quiet

plant-life of the world, with the assistance of the sun, is doing this and building up wood, enormous quantities of which are used to make paper, while the depletion of the natural forests is going on so rapidly that there is dread of a famine of the raw material for making paper.

One of the almost famous woods of the United States was white pine. It is now nearly extinct. This is a good illustration of the need of reforestation. And the forests of the country, which are diminishing only far too rapidly, are doing their part in maintaining the oxygen supply of the world.

The principal work of what is known as a commercial chemist is analysis, the determination of the quantities, usually called percentages, of one or more substances in a sample of a product. The weighing of the analysis, such as that of the quantity taken for the analysis and that of the substances from which the percentages of the constituents are determined, is done on an analytical balance. The chemist is not addicted to calling it a scales. On showing visitors through the laboratory, one of the ways of showing the delicacy of the balance was to cut two hairs from different peoples' heads, to cut them of the same length and putting them on the pans of the balance to show that they did not weigh the same. No two hairs of equal length are of exactly the same weight.

In pouring solutions from one vessel into another the greatest care has to be exercised to avoid losing the least drop of the liquid. To prevent any of it running down the outside of the vessel from which it is being poured the chemist uses a glass rod and holds it against the lip of the vessel from which it is being poured. The chemist

has a rather poetical name for the tumbler-like vessels he uses, they are called beakers. This way of pouring is mentioned because a chemist is very apt to use it in the dining-room, when he may find that a pitcher will not pour nicely. So when you see anyone holding a spoon against the mouth of a pitcher or syrup jug to obtain a nice pouring of the molasses or whatever it may be, you are quite safe in putting him down as a chemist.

Real chemical analysis originated about the beginning of the last century. The French chemist, Lavoisier, shares with the English cleric, Priestly, the honor of separating oxygen from one of its chemical compounds. This was an unbinding or an analysis. The generic name would more properly be a decomposition, which is a true unbinding. Both of these investigators had troubled days, Priestly was in danger from mob violence in his English home, and he came to Pennsylvania and there discovered oxygen. Lavoisier was executed by the French revolutionists. It is said that he was working on some experiment when arrested, and said he wanted to finish it before going before the revolutionary tribunal, but was told that France had no need of a chemist. But in a few more years the country had bitter need of one, when the supply of sodium carbonate, an essential in the manufacture of soap, and which had come from Spain, was cut off by the Napoleonic wars. An inventor saved the day by devising a process for making it from salt. This led to one of the greatest chemical manufacturing processes of technical development. The use of the soda thus produced was to make soap. It was said that the civilization of a nation could be estimated by the amount of soap they made. This had no reference to clean-

liness, but simply to the extent of the chemical soda industry. The inventor was named Le Blanc, and revolutionized one department of chemistry, and started the greatest chemical industry of the time and, after all this, died without reaping the reward due to his genius.

Synthesis is literally putting together or "putting with." In the cylinders of an automobile engine, gasoline, a chemical combination of carbon and hydrogen, is burned. The carbon unites with the oxygen of the air, forming carbon dioxide and unfortunately also carbon monoxide, the latter involving a waste of energy and a number of deaths, because it is a deadly poison when inhaled. A number of people have been killed by inhaling the exhaust of an automobile engine. The hydrogen of the gasoline combines with the oxygen of the air and produces steam, which is gaseous water. These combinations are syntheses, the putting together of substances which have an affinity for each other. Every fire is a synthesis or several of them. In the chemical laboratory compounds are constantly being produced in the course of investigations or in analytical work. But the two words are rather restricted in their use in ordinary speech, decomposition and combination are more often used except in special cases. These are taken from the Latin, slightly anglicized, but seem to be more familiar, more of everyday language, than the two Greek words at the head of this article.

Analysis or decomposition of a chemical compound in the vast majority of cases absorbs energy, implying a loss of efficiency in any engineering proposition or process. On its face anthracite coal is more efficient than bituminous, the so-called soft coal of

commerce and engineering. In the use of anthracite coal there is no separation of carbon and hydrogen, while, in burning soft-coal, carbon and hydrogen have to be separated from their chemical combination. Before producing power by burning, the decomposition of the compounds of carbon and hydrogen of which they are composed, involves a loss in their production of power. We never stop to think of it, but, if the same quantity of uncombined hydrogen and of carbon could be burned, a better result would be obtained.

It may now be asked what is the condition of the air, the supporter of combustion, of fuels as well as of the slower combustions of the animal system? Air is a simple mixture. It is not a chemical combination, so it supplies the oxygen for burning fuel free of loss by decomposition or, going to the Greek word, without analysis. But no one would ever use the word analysis in this connection even if it seems to be etymologically correct. In this world it is possible to be over-correct. But it is interesting to realize that as we breathe this air, or as we use it to maintain our fires and play its part in so many phases of our life, that the oxygen of the air is at our service, quite disconnected from any thing. There is no decomposition to put it at our service, it is the freest gift in the world, and, lest it be too strong for us in itself, it is diluted, not combined, with the, rather strange element, nitrogen. Without the approximately four parts of nitrogen to its one part, we would have a very exciting time on this earth, for combustion of fuel and

similar substances would be violent to the last degree. A fire once started would be almost inextinguishable; the earth would become a pyrotechnic.

And the innocent nitrogen represses its potential violence. This gas is quite free, not synthesized with anything. But the innocent nitrogen is a good illustration of what changes can be brought about by chemical combination. Combined chemically with the element, carbon, it forms the cyanide compounds, virulent poisons some of them; it enters into chemical compounds to give the most powerful explosives. The letters TNT are familiar as the abbreviated name of the most prominent military explosive. The middle letter indicates that there is nitrogen in it. Enormous quantities were used in the World War. Nitrogen is a constituent of some colors, such as prussian blue. And because in the air it is not combined with any other element or elements, we inhale great volumes into our system as long as we live.

But there is another element, helium, which is much lighter than nitrogen, and is non-combustible. It is so light that it is used in balloons to give them buoyancy, replacing the highly combustible hydrogen. For certain troubles of the human system it has been proposed to substitute it for nitrogen in the air we breathe. This would be done for special cases only under the administrations of a physician. It is the ideal gas for inflating balloons. It need not be used pure but can have a considerable percentage of hydrogen mixed with it, without making a dangerously inflammable mixture.

Uncertainty

By JOHN W. CAMPBELL, JR.

We are sure that our readers will be delighted to see the name of Mr. Campbell again on our pages. We wish to tell nothing about the story, but we can promise that it will be startling, and will have the characteristic touch of the distinguished author.

PART I

CHAPTER I

PATROL Cruiser "I. P.-T 247" circling out toward Pluto on leisurely inspection tour to visit the outpost miners there, was in no hurry at all as she loafed along. Her six-man crew was taking it very easy, and easy meant two-man watches, and low speed, to watch for the instrument panel and attend ship into the bargain.

She was about thirty million miles off Pluto, just beginning to get in touch with some of the larger mining stations out there, when Buck Kendall's turn at the controls came along. Buck Kendall was one of life's little jokes. When nature made him, she was absent minded. Buck stood six feet two in his stocking feet, with his usual slight stoop in operation. When he forgot, and stood up straight, he loomed about two inches higher. He had the body and muscles of a dock navvy, which Nature started out to make. Then she forgot and added something of the same stuff she put in Sir Francis Drake. Maybe that made Old Nature nervous, and she started adding different things. At any rate, Kendall, as finally turned out, had a brain that put him in the first rank of scientists—when he felt like it—the general constitution of an ostrich and a flair for gambling.

The present position was due to such a gamble. An IP man, a friend of his, had made the mistake of betting him a thousand dollars he wouldn't get beyond a Captain's bars in the Patrol. Kendall had liked the idea anyway, and adding a bit of a bet to it made it irresistible. So, being a very particular kind of a fool, the glorious kind which old Nature turns out now and then, he left a five million dollar estate on Long Island, Terra, that same evening, and joined up in the Patrol. The Sir Francis Drake strain had immediately come forth—and Kendall was having the time of his life. In a six-man cruiser, his real work in the Interplanetary Patrol had started. He was still in it—but it was his command now, and a blue circle on his left sleeve gave his lieutenant's rank.

BUCK KENDALL had immediately proceeded to enlist in his command the IP man who had made the mistaken bet, and Rad Cole was on duty with him now. Cole was the technician of the T-247. His rank as Technical Engineer was practically equivalent to Kendall's circle-rank, which made the two more comfortable together.

Cole was listening carefully to the signals coming through from Pluto.



"Say—Cole, is that any ship you ever heard of before? I DON'T THINK THAT'S JUST A PIRATE!"

"That," he decided, "sounds like Tad Nichols' fist. You can recognize that broken down truck-horse trot of his on the key as far away as you can hear it.

"Is that what it is?" sighed Buck. "I thought it was static mushing him at first. What's he like?"

"Like all the other damn fools who come out two billion miles to scratch rock, as if there weren't enough already on the inner planets. He's got a rich platinum property. Sells ninety percent of his output to buy his power, and the other eleven percent for his clothes and food."

"He must be an efficient miner," suggested Kendal, "to maintain 101% production like that."

"No, but his bank account is. He's figured out that's the most economic level of production. If he produces less, he won't be able to pay for his heating power, and if he produces more, his operation power will burn up his bank account too fast."

"Hmmm—sensible way to figure. A man after my own heart. How does he plan to restock his bank account?"

"By mining on Mercury. He does it regularly—sort of a commuter. Out here his power bills eat it up. On Mercury he goes in for potassium, and sells the power he collects in cooling his dome, of course. He's a good miner, and the old fool can make money down there." Like any really skilled operator, Cole had been sending Morse messages while he talked. Now he sat quiet waiting for the reply, glancing at the chronometer.

"I take it he's not after money—just after fun," suggested Buck.

"Oh, no. He's after money," replied Cole gravely. "You ask him—he's going to make his eternal fortune yet

by striking a real bed of jovium, and then he'll retire."

"Oh, one of that kind."

"They all are," laughed Cole—"Eternal hope, and the rest of it." He listened a moment and went on, "But old Nichols is a first-grade engineer. He wouldn't be able to remake that bankroll every time if he wasn't. You'll see his Dome out there on Pluto—it's always the best on the planet. Tip-top shape. And he's a bit of an experimenter too. Ah—he's with us."

Nichol's ragged signals were coming through—or pounding through. They were worse than usual, and at first Kendal and Cole couldn't make them out. Then finally they got them in bursts. The man was excited, and his bad key-work made it worse. "—Randing stopped. They got him I think. He said—th—ship as big—a—nsport. Said it wa—eaded my—ay. Neutrons—on instruments—he's coming over the horizon—it's huge—war ship I think—register—instru—neutrons—." Abruptly the signals were blanked out completely.

COLE and Kendal sat frozen and stiff. Each looked at the other abruptly, then Kendal moved. From the receiver, he ripped out the recording coil, and instantly jammed it into the analyzer. He started it through once, then again, then again, at different tone settings, till he found a very shrill whine that seemed to clear up most of Nichols' bad key work. "T-247—T-247—Emergency. Emergency. Randing reports the—over his horizon. Huge—ip—reign manufacture. Almost spherical. Randing's stopped. They got him I think. He said the ship was as big as a transport. Said it was headed my way. Neutrons—ont—gister—instruments. I think

—is h—he's coming over the horizon. It's huge, and a war ship I think—register—instruments—neutrons."

Kendall's finger stabbed out at a button. Instantly the noise of the other men, wakened abruptly by the mild shocks, came from behind. Kendall swung to the controls, and Cole raced back to the engine room. The hundred foot ship shot suddenly forward under the thrust of her tail ion-rockets. A blue-red cloud formed slowly behind her and expanded. Talbot appeared, and silently took her over from Kendall. "Stations, men," snapped Kendall. "Emergency call from a miner of Pluto reporting a large armed vessel which attacked them." Kendall swung back, and eased himself against the thrusting acceleration of the over-powered little ship, toward the engine room. Cole was bending over his apparatus, making careful check-ups, closing weapon-circuits. No window gave view of space here, on the left was the tiny tender's pocket, on the right, above and below the great water tanks that fed the ion rockets, behind the rockets themselves. The tungsten metal walls were cold and grey under the sharp lights, the hunched bulks of the apparatus crowded the tiny room. Gigantic racked accumulators huddled in the corners. Martin and Garnet swung into position in the fighting-tanks just ahead of the power rooms, Canning slid rapidly through the engine room, oozed through a tiny door, and took up his position in the stern-chamber, seated half-over the great ion-rocket sheath.

"Ready in positions, Captain Kendall," called the war-pilot as the little green lights appeared on his board.

"Test discharges on maximum," ordered Kendall. He turned to Cole. "You start the automatic key?"

"Right, Captain."

"All ship-shape?"

"Right as can be. Accumulators at thirty-seven per cent, thanks to the loaf out here. They ought to pick up our signal back on Jupiter, he's nearest now. The station on Europa will get it."

"Talbot—we are only to investigate, if the ship is as reported. Have you seen any signs of her?"

"No sir, and the signals are blank."

"I'll work from here." Kendall took his position at the commanding control. Cole made way for him, and moved to the power board. One by one he tested the automatic doors, the pressure bulkheads. Kendall watched the instruments as one after another of the weapons were tested on momentary full discharge—titantic flames of five million volt protons. Then the ship thudded to the chatter of the Garnet rifles.

TENSELY the men watched the planet ahead, white, yet barely visible in the weak sunlight so far out. It was swimming slowly nearer as the tiny ship gathered speed.

Kendall cast a glance over his detector-instruments. The radio network was undisturbed, the magnetic and electric fields recognized only the slight disturbances occasioned by the planet itself. There was nothing, noth—

Five hundred miles away, a gigantic ship came into instantaneous being. Simultaneously, and instantaneously, the various detector systems howled their warnings. Kendall gasped as the thing appeared on his view screen, with the scale-lines below. The scale must be cock-eyed. They said the ship was fifteen hundred feet in diameter, and two thousand long!

"Retreat," ordered Kendall, "at maximum acceleration."

Talbot was already acting. The gyroscopes hummed in their castings, and the motors creaked. The T-247 spun on her axis, and abruptly the acceleration built up as the ion-rockets began to shudder. A faint smell of "heat" began to creep out of the converter. Immense "weight" built up, and pressed the men into their specially designed seats—

The gigantic ship across the way turned slowly, and seemed to stare at the T-247. Then it darted toward them at incredible speed till the poor little T-247 seemed to be standing still, as sailors say. The stranger was so gigantic now, the screens could not show all of him.

"God, Buck—he's going to take us!"

Simultaneously, the T-247 rolled, and from her broke every possible stream of destruction. The ion-rocket flames swirled abruptly toward her, the proton-guns whined their song of death in their housings, and the heavy pounding shudder of the Garnell guns racked the ship.

Strangely, Kendall suddenly noticed, there was a stillness in the ship. The guns and the rays were still going—but the little human sounds seemed abruptly gone.

"Talbot,—Garnet—" Only silence answered him. Cole looked across at him in sudden white-faced amazement.

"They're gone—" gasped Cole.

Kendall stood paralyzed for thirty seconds. Then suddenly he seemed to come to life. "Neutrons! Neutrons—and water tanks! Old Nichols was right—. "He turned to his friend. "Cole—the tender—quick." He darted a glance at the screen. The giant ship still lay alongside. A wash of ions was curling around her, splitting, and passing on. The pin-prick explosions of the

Garnell shells dotted space around her—but never on her.

Cole was already racing for the tender lock. In an instant Kendall piled in after him. The tiny ship, scarcely ten feet long, was powered for flights of only two hours acceleration, and had oxygen for but twenty-four hours for six men, seventy two hours for two men—maybe. The heavy door was slammed shut behind them, as Cole seated himself at the panel. He depressed a lever, and a sudden smooth push shot them away from the T-247.

"DON'T!" called Kendall sharply as Cole reached for the ion-rocket control. "Douse those lights!" The ship was dark in dark space. The lighted hull of the T-247 drifted away from the little tender—further and further till the giant ship on the far side became visible.

"Not a light—not a sign of fields in operation." Kendall said, unconsciously speaking softly. "This thing is so tiny, that it may escape their observation in the fields of the T-247 and Pluto down there. It's our only hope."

"What happened? How in the name of the planets did they kill those men without a sound, without a flash, and without even warning us, or injuring us?"

"Neutrons—don't you see?"

"Frankly, I don't. I'm no scientist—merely a technician. Neutrons aren't used in any process I've run across."

"Well, remember they're uncharged, tiny things. Small as protons, but without electric field. The result is they pass right through an ordinary atom without being stopped unless they make a direct hit. Tungsten, while it has a beautifully high melting point, is mostly open space, and a neutron just sails right through it, or any heavy atom. Light atoms stop neutrons better—there's less open

space in 'em. Hydrogen is best. Well—a man is made up mostly of light elements, and a man stops those neutrons—it isn't surprising it killed those other fellows invisibly, and without a sound."

"You mean they bathed that ship in neutrons?"

"Shot it full of 'em. Just like our proton guns, only sending neutrons."

"Well, why weren't we killed too?"

"Water stops neutrons," I said. Figure it out."

"The rocket-water tanks—all around us! Great masses of water—" gasped Cole. "That saved us?"

"Right. I wonder if they've spotted us."

THE stranger ship was moving slowly in relation to the T-247. Suddenly the motion changed, the stranger spun—and a giant lock appeared in her side, opened. The T-247 began to move, floated more and more rapidly straight for the lock. Her various weapons had stopped operating now, the hoppers of the Garnell guns exhausted, the charge of the accumulators aboard the ship down so low the proton guns had died out.

"Lord—they're taking the whole ship!"

"Say—Cole, is that any ship you ever heard of before? *I don't think that's just a pirate!*"

"Not a pirate—what then?"

"How'd he get inside our detector screens so fast? Watch—he'll either leave, or come after us—" The T-247 had settled inside the lock now, and the great metal door closed after it. The whole patrol ship had been swallowed by a giant. Kendall was sketching swiftly on a note-book, watching the vast ship closely, putting down a record of its lines, and formation. He

glanced up at it, and then down for a few more lines, and up at it—

The stranger ship abruptly dwindled. It dwindled with incredible speed, rushing off along the line of sight at an impossible velocity, and abruptly clicking out of sight, like an image on a movie-film that has been cut, and repaired after the scene that showed the final disappearance.

"Cole—Cole—did you get that? Did you see—do you understand what happened?" Kendall was excitedly shouting now.

"He missed us," Cole sighed. "It's a wonder—hanging out here in space, with the protector of the T-247's fields gone." "No, no, you asteroid—that's not it. *He went off faster than light itself!*"

"Eh—what? Faster than light? That can't be done—"

"He did it, I know he did. That's how he got inside our screens. He came inside faster than the warning message could relay back the information.* Didn't you see him accelerate to an impossible speed in an impossible time? Didn't you see how he just vanished as he exceeded the speed of light, and stopped reflecting it? *That ship was no ship of this solar system!*"

"Where did he come from then?"

"God only knows, but it's a long, long way off."

CHAPTER II

THE IP-M-122 picked them up. The M-122 got out there two days later, in response to the calls the T-247 had sent out. As soon as she got within ten million miles of the little tender, she began getting Cole's signals, and within twelve hours had reached the tiny thing, located it, and picked it up.

Captain Jim Warren was in command, one of the old school commanders of the IP. He listened to Kendall's report, listened to Cole's tale—and radioed back a report of his own. Space pirates in a large ship had attacked the T-247, he said, and carried it away. He advised a close watch. On Pluto, his investigations disclosed nothing more than the fact that three mines had been raided, all platinum supplies taken, and the records and machinery removed.

The M-122 was a fifty man patrol cruiser, and Warren felt sure he could handle the menace alone, and hung around for over two weeks looking for it. He saw nothing, and no further reports came of attack. Again and again, Kendall tried to convince him this ship he was hunting was no mere space pirate, and again and again Warren grunted, and went on his way. He would not send in any report Kendall made out, because to do so would add his indorsement to that report. He would not take Kendall back, though that was well within his authority.

In fact, it was a full month before Kendall again set foot on any of the Minor Planets, and then it was Mars, the base of the M-122. Kendall, and Cole took passage immediately on an IP supply ship, and landed in New York six days later. At once, Kendall headed for Commander McLaurin's office. Buck Kendall, lieutenant of the IP, found he would have to make regular application to see McLaurin through a dozen intermediate officers.

By this time, Kendall was savagely determined to see McLaurin himself, and see him in the least possible time. Cole, too was beginning to believe in Kendall's assertion of the stranger ship's extra-systemic origin. As yet neither could understand the strange actions of the machine, its attack on

the Pluto mines, and the capture and theft of a patrol ship.

"There is," said Kendall angrily, "just one way to see McLaurin and see him quick. And, by God, I'm going to. Will you resign with me, Cole? I'll see him within a week then, I'll bet."

For a minute, Cole hesitated. Then he shook hands with his friend. "Today!" And that day it was. They resigned, together. Immediately, Buck Kendall got the machinery in motion for an interview, working now from the outside, pulling the strings with the weight of a hundred million dollar fortune. Even the IP officers had to pay a bit of attention when Bernard Kendall, multi-millionaire began talking and demanding things. Within a week, Kendall *did* see McLaurin.

At that time, McLaurin was fifty-three years old, his crisp hair still black as space, with scarcely a touch of the grey that appears in his more recent photographs. He stood six feet tall, a broad-shouldered, powerful man, his face grave with lines of intelligence and character. There was also a permanent narrowing of the eyes, from years under the blazing sun of space. But most of all, while those years in space had narrowed and set his eyes, they had not narrowed and set his mind. An infinitely finer character than old Jim Warren, his experience in space had taught him always to expect the unexpected, to understand the incomprehensible as being part of the unknown and incalculable properties of space and the worlds that swam in it. Besides the fine technical education he had started with, he had acquired a liberal education in mankind. When Buck Kendall, straight and powerful, came into his office with Cole, he recognized in him a character that would drive steadily and straight for

its goal. Also, he recognized behind the millionaire that had succeeded in pulling wires enough to see him, the scientist who had had more than one paper published "in an amateur way".

"Dr. Bernard Kendall?" he asked rising.

"Yes, sir. Late Buck Kendall, lieutenant of the IP. I quit and got Cole here to quit with me, so we could see you."

"Unusual tactics. I've had several men join up to get an interview with me," smiled McLaurin.

"Yes, I can imagine that, but we had to see you in a hurry. A hidebound old rascalion by the name of Jim Warren picked us up out by Pluto, floating around in a six-man tender. We made some reports to him, but he wouldn't believe, and he wouldn't send them through—so we had to send ourselves through. Sir, this system is about to be attacked by some extra-systemic race. The IP-T-247 was so attacked, her crew killed off, and the ship itself carried away."

"I got the report Captain Jim Warren sent through, stating it was a gang of space pirates. Now what makes you believe otherwise?"

"That ship that attacked us, attacked with a neutron gun, a gun that shot neutrons through the hull of our ship as easily as protons pass through open space. Those neutrons killed off four of the crew, and spared us only because we happened to be behind the water tanks. Masses of hydrogen will stop neutrons, so we lived, and escaped in the tender. The little tender, lightless, escaped their observation, and we were picked up. Now, when the 247 had been picked up, and locked into their ship, that ship started accelerating. It accelerated so fast along my line of sight that it just dwindled, and—vanished. It didn't vanish in dis-

tance, it vanished *because it exceeded the speed of light.*"

"Isn't that impossible?"

"Not at all. It can be done—if you can find some way of escaping from this space to do it. Now if you could cut across through a higher dimension, your *projection* in this dimension might easily exceed the speed of light. For instance, if I could cut directly through the earth, at a speed of one thousand miles an hour, my projection on the surface would go twelve thousand miles while I was going eight. Similarly, if you could cut *through* the four dimensional space instead of following its surface, you'd attain a speed greater than light."

"Might it not still be a space pirate? That's a lot easier to believe, even allowing your statement that he exceeded the speed of light."

"If you invented a neutron gun which could kill through tungsten walls without injuring anything within, a system of accelerating a ship that didn't affect the inhabitants of that ship, and a means of exceeding the speed of light, all within a few months of each other, would you become a pirate? I wouldn't, and I don't think any one else would. A pirate is a man who seeks adventure and relief from work. Given a means of exceeding the speed of light, I'd get all the adventure I wanted investigating other planets. If I didn't have a cent before, I'd have relief from work by selling it for a few hundred millions—and I'd sell it mighty easily too, for an invention like that is worth an incalculable sum. Tie to that the value of compensated acceleration, and no man's going to turn pirate. He can make more millions selling his inventions than he can make thousands turning pirate with them. So who'd turn pirate?"

"Right," nodded McLaurin. "I see

your point. Now before I'd accept your statements in *re* the 'speed of light' thing, I'd want opinions from some IP physicists."

"Then let's have a conference, because something's got to be done soon. I don't know why we haven't heard further from that fellow."

"Privately—we have," McLaurin said in a slightly worried tone. "He was detected by the instruments of every IP observatory I suspect. We got the reports but didn't know what to make of them. They indicated so many funny things, they were sent in as accidental misreadings of the instruments. But since *all* the observatories reported them, similar misreadings, at about the same times, that is with variations of only a few hours, we thought something must have been up. The only thing was the phenomena were reported progressively from Pluto to Neptune, clear across the solar system, in a definite progression, but at a velocity of crossing that didn't tie in with any conceivable force. They crossed faster than the velocity of light. That ship must have spent about half an hour off each planet before passing on to the next. And, accepting your faster-than-light explanation, we can understand it."

"Then I think you have proof."

"If we have, what would you do about it?"

"Get to work on those 'misreadings' of the instruments for one thing, and for a second, and more important, line every IP ship with paraffine blocks six inches thick."

"Paraffine—why?"

"The easiest form of hydrogen to get. You can't use solid hydrogen, because that melts too easily. Water can be turned into steam too easily, and requires more work. Paraffine is a solid that's largely hydrogen. That's

what they've always used on neutrons since they discovered them. Confine your paraffine between tungsten walls, and you'll stop the secondary protons as well as the neutrons."

"Hmmm—I suppose so. How about seeing those physicists?"

"I'd like to see them to-day, sir. The sooner you get started on this work, the better it will be for the IP."

"Having seen me, will you join up in the IP again?" asked McLaurin.

"No, sir, I don't think I will. I have another field you know, in which I may be more useful. Cole here's a better technician than fighter—and a darned good fighter too—and I think that an inexperienced space-captain is a lot less useful than a second rate physicist at work in a laboratory. If we hope to get anywhere, or for that matter, I suspect, stay anywhere, we'll have to do a lot of research pretty promptly."

"What's your explanation of that ship?"

"One of two things: an inventor of some other system trying out his latest toy, or an expedition sent out by a planetary government for exploration. I favor the latter for two reasons: that ship was *big*. No inventor would build a thing that size, requiring a crew of several hundred men to try out his invention. A government would build just about that if they wanted to send out an expedition. If it were an inventor, he'd be interested in meeting other people, to see what they had in the way of science, and probably he'd want to do it in a peaceable way. That fellow wasn't interested in peace, by any means. So I think it's a government ship, and an unfriendly government. They sent that ship out either for scientific research, for trade research and exploration, or for acquisitive exploration. If they were out

for scientific research, they'd proceed as would the inventor, to establish friendly communication. If they were out for trade, the same would apply. If they were out for acquisitive exploration, they'd investigate the planets, the sun, the people, only to the extent of learning how best to overcome them. They'd want to get a sample of our people, and a sample of our weapons. They'd want samples of our machinery, our literature and our technology. That's exactly what that ship got.

"Somebody, somewhere out there in space, either doesn't like their home, or wants more home. They've been out looking for one. I'll bet they sent out hundreds of expeditions to thousands of near by stars, gradually going further and further, seeking a planetary system. This is probably the one and only one they found. It's a good one too. It has planets at all temperatures, of all sizes. It is a fairly compact one, it has a stable sun that will last far longer than any race can hope to."

"Hmm—how can there be good and bad planetary systems?" asked McLaurin. "I'd never thought of that."

Kendall laughed. "Mighty easy. How'd you like to live on a planet of a Cepheid Variable? Pleasant situation, with the radiation flaring up and down. How'd you like to live on a planet of Antares. That blasted sun is so big, to have a comfortable planet you'd have to be at least ten billion miles out. Then if you had an inter-planetary commerce, you'd have to struggle with orbits tens of billions of miles across instead of mere millions. Further, you'd have a sun so blasted big, it would take an impossible amount of energy to lift the ship up from one planet to another. If your trip was, say, twenty billions of miles to the next planet, you'd be

fighting a gravity as bad as the solar gravity at earth here all the way—no decline with a little distance like that."

"H-m-m-m—quite true. Then I should say that Mira would take the prize. It's a red giant, and it's an irregular variable. The sunlight there would be as unstable as the weather in New England. It's almost as big as Antares, and it won't hold still. Now that *would* make a bad planetary system."

"It would!" laughed Kendall. But as we know—he laughed too soon, and he shouldn't have used the conditional. He should have said, "It does!"

CHAPTER III

GRESTH GKAE, Commander of Expeditionary Force 93, of the Planet Sthor, was returning homeward with joyful mind. In the lock of his great ship, lay the T-247. In her cargo holds lay various items of machinery, mining supplies, foods, and records. And in her log books lay the records of many readings on the nine larger planets of a highly satisfactory planetary system.

Gresth Gkae had spent no less than three ultra-wearing years going from one sun to another in a definitely mapped out section of space. He had investigated only eleven stars in that time, eleven stars, progressively further from the titanic red-flaming sun he knew as "the" sun. He knew it as "the" sun, and had several other appellations for it. Mira was so-named by earth-men because it was indeed a "wonder" star, in Latin, mirare means "to wonder." Irregularly, and for no apparent reason it would change its rate of radiation. So far as those inhabitants of Sthor and her sister world Asthor knew, there was

no reason. It just did it. Perhaps with malicious intent to be annoying. If so, it was exceptionally successful. Sthor and Asthor experienced, periodically, a young ice age. When Mira decided to take a rest, Sthor and Asthor froze up, from the poles most of the way to the equators. Then Mira would stretch herself a little, move about restlessly and Sthor and Asthor would become uninhabitably hot, anywhere within twenty degrees of the equator.

Those Sthorian people had evolved in a way that made the conditions endurable for savage or uncivilized people, but when a scientific civilization with a well-ordered mode of existence tried to establish itself, Mira was all sorts of a nuisance.

Gresth Gkæ was a peculiar individual to human ways of thinking. He stood some seven feet tall, on his strange, double-kneed legs and his four toed feet. His body was covered with little, short feather-like things that moved now with a volition of their own. They were moving very slowly and regularly. The space-ship was heated to a comfortable temperature, and the little fans were helping to cool Gresth Gkæ. Had it been cold, every little feather would have lain down close against its neighbors, forming an admirable, wind-proof and cold-proof blanket.

Nature, on Sthor, had original ideas of arrangement too. Sthorians possessed two eyes—one directly above the other, in the center of their faces. The face was so long, and narrow, it resembled a blunt hatchet, with the two eyes on the edge. To counter-balance this vertical arrangement of the eyes, the nostrils had been separated some four inches, with one on each of the sloping cheeks. His ears were little pink-flesh cups on

short, muscular stems. His mouth was narrow, and small, but armed with quite solid teeth adapted to his diet, a diet consisting of almost anything any creature had ever considered edible. Like most successful forms of intelligent life, Gresth Gkæ was omnivorous. An intelligent form of life is necessarily adaptable, and adaptation meant being able to eat what was at hand.

One of his eyes, the upper one, was fully twice the size of the lower one. This was his telescopic eye. The lower, or microscopic eye was adapted to work for which a human being would have required a low power microscope, the upper eye possessed a more normal power of vision, *plus* considerable telescopic powers.

Gresth Gkæ was using it now to look ahead in the blank of space to where gigantic Mira appeared. On his screens now, Mira appeared deep violet, for he was approaching at a speed greater than that of light, and even this projected light of Mira was badly distorted.

"The distance is half a light year now, sir," reported the navigation officer.

"Reduce the speed, then, to normal velocity for these ranges. What reserve of fuel have we?"

"Less than one thousand pounds. We will barely be able to stop. We were too free in the use of our weapons, I fear," replied the Chief Technician.

"Well, what would you? We needed those things in our reports. Besides, we could extract fuel from that ore we took on at Planet Nine of Phahlo. It is merely that I wish speed in the return."

"As we all do. How soon do you believe the Council will proceed against the new system?"

"It will be fully a year, I fear. They must gather the expeditions together, and re-equip the ships. It will be a long time before all will have come in."

"Could they not send fast ships after them to recall them?"

"Could they have traced us as we wove our way from Thart to Karst to Raloork to Phahlo? It would be impossible."

STEADILY the great ship had been boring on her way. Mira had been a disc for nearly two days, gigantic, two-hundred-and-fifty-million-mile Mira took a great deal of dwarfing by distance to lose her disc. Even at the Twin Planets, eight thousand two hundred and fifty millions of miles out, Mira covered half the sky, it seemed, red and angry. Sometimes, though, to the disgust of the Sthorians it was just red-faced and lazy. Then Sthor froze.

"Grih is in a descendent stage," said the navigation officer presently. "Sthor will be cold when we arrive."

"It will warm quickly enough with our news!" Gresth laughed. "A system—a delightful system—discovered. A system of many close-grouped planets. Why think—from one side of that system to the other is less of a distance than from Ansthat, our first planet's orbit, to Insthor's orbit! That sun, as we know, is steady and warm. All will be well, when we have eliminated that rather peculiar race. Odd, that they should, in some ways, be so nearly like us! Nearly Sthorian in build. I would not have expected it. Though they did have some amazing peculiarities! Imagine—two eyes just alike, and in a horizontal row. And that flat face. They looked as though they had suffered some accident that smashed the front of the face in. And

also the peculiar beak-like projection. Why should a race ever develop so amazing a projection in so peculiar and exposed a position? It sticks out inviting attack and injury. Right in the middle of the face. And to make it worse, there is the air-channel, and the only air channel. Why, one minor injury to the throat would be certain to damage that passage beyond repair, and bring death. Yet such relatively unimportant things as ears, and eyes are doubled. Surely you would expect that so important a member as the air-passage would be doubled for safety.

"Those strange, awkward arms and legs were what puzzled me. I have been attempting to manipulate myself as they must be forced to, and I cannot see how delicate or accurate manual manipulation would be possible with those rigid, inflexible arms. In some ways I feel they must have had clever minds to overcome so great a handicap to constructive work. But I suppose single joints in the arms become as natural to them as our own more mobile two.

"I wonder if life in any intelligent form wouldn't develop somewhat similar formations, though. Think, in all parts of Sthor, before men became civilized and developed communication, even so much as twenty thousand years ago, our records show that seats and chairs were much as they are today, and much as they are, in all places among all groups. Then too, the eye has developed in many different species, and always reached much the same structure. When a thing is intended and developed to serve a given purpose, no matter who develops it, or where or how, is it not apt to have similar shapes and parts? A chair must have legs, and a seat and arm-rests and a back. You may

vary their nature and their shape, but not widely, and they must be there. An eye must, anywhere, have a sensitive retina, an adjustable lens, and an adjustable device for controlling the entrance of light. Similarly there are certain functions that the body of an intelligent creature must serve which naturally tend to make intelligent creatures similar. He must have a tool—the hand—”

“Yes, yes—I see your point. It must be so, for surely these creatures out there are strange enough in other ways.

“But tell me, have you calculated when we shall land?”

“In twelve hours, thirty-three minutes, Sir.”

Eleven hours later, the expedition ship had slowed to a normal space-speed. On her left hung the giant globe of Asthor, rotating slowly, moving slowly in her orbit. Directly ahead, Sthor loomed even greater. Tiny Teelan, the thousand-mile diameter moon of the Insthor system shone dull red in the reflected light of gigantic Mira. Mira herself was gigantic, red and menacing across eight and a quarter billions of miles of space.

One hundred thousand miles apart, the twin worlds Sthor and Asthor rotated about their common center of gravity, eternally facing each other. Ten million miles from their common center of gravity, Teelan rotated in a vast orbit.

Sthor and Asthor were capped at each pole now by gigantic white ice-caps. Mira was sulking, and as a consequence the planets were freezing.

The expedition ship sank slowly toward Sthor. A swarm of smaller craft had flown up at its approach to meet it. A gayly-colored, small ship

marked the official greeting-ship. Gresth had withheld his news purposely. Now suddenly he began broadcasting it from the powerful transmitter on his ship. As the words came through on a thousand sets, all the little ships began to whirl, dance and break out into glowing, sparkling lights. On Sthor and Asthor even commotions began to be visible. A new planetary system had been found—They could move! Their overflowing populations could be spread out!

The whole Insthor system went mad with delight as the great Expeditionary Ship settled downward.

CHAPTER IV

THERE was a glint of humor in Buck Kendall's eyes as he passed the sheet over to McLaurin. Commander McLaurin looked down the columns with twinkling eyes.

“‘Petition to establish the Lunar Mining Bank,’” he read. “What-a bank! Officers: President, General James Logan, late of the IP; Vice-president, Colonel Warren Gerardhi, also late of the IP; Staff, consists of 90% ex-IP men, and a few scattered accountants. Designed by the well-known designer of IP stations, Colonel Richard Murray.” Commander McLaurin looked up at Kendall with a broad grin. “And you actually got Interplanetary Life to give you a mortgage on the structure?”

“Why not? It'll cost fifty-eight millions, with its twelve-foot tungsten-beryllium walls and the heavy defense weapons against those terrible pirates. You know we must defend our property.”

“With the thing you're setting up out there on Luna, you could more readily wipe out the IP than any-

thing else I know of. Any new defense ideas?"

"Plenty. Did you get any further appropriations from the IP Appropriations Board?"

McLaurin looked sour. "No. The dear taxpayers might object, and those thick-headed, clogged rockets on the Board can't see your data on the Stranger. They gave me just ten millions, and that only because you demonstrated you could shoot every living thing out of the latest IP cruiser with that neutron gun of yours. By the way, they may kick when I don't install more than a few of those."

"Let 'em. You can stall for a few months. You'll need that money more for other purposes. You've installed that paraffine lining?"

"Yes—I got a report on that of 'finished' last week. How have you made out?"

Buck Kendall's face fell. "Not so hot. Devin's been the biggest help—he did most of the work on that neutron gun really—"

"After," McLaurin interrupted, "you told him how."

"—but we're pretty well stuck now, it seems. You'll be off duty tomorrow evening, can't you drop around to the lab.? We're going to try out a new system for releasing atomic energy."

"Isn't that a pretty faint hope? We've been trying to get it for three centuries now, and haven't yet. What chance at it within a year or so?—which is the time you allow yourself before the Stranger returns."

"It is, I'll admit that. But there's another factor, not to be forgotten. The data we got from correlating those 'misreadings' from the various IP posts mean a lot. We are working on an entirely different trail now. You come on out, and you can see

our new apparatus. They are working on tremendous voltages, and hoping to smash the thing by a brutal bombardment of terrific voltage. We're trying, thanks to the results of those instruments, to get results with small, terrifically intense fields."

"How do you know that's their general system?"

"They left traces on the records of the post instruments. These records show such intensities as we never got. They have atomic energy, necessarily, and they might have had material energy, actual destruction of matter, but apparently, from the field readings it's the former. To be able to make those tremendous hops, light-years in length, they needed a real store of energy. They have accumulators, of course, but I don't think they could store enough power by the system they use to do it."

"Well, how's your trick 'boot' out on Luna, despite its twelve-foot walls, going to stand an atomic explosion?"

"More protective devices to come is our only hope. I'm working on three trails: atomic energy, some type of magnetic shield that will stop any moving material particle, and their faster-than-light thing. Also, that fortress—I mean, of course bank—is going to have a lot of lead-lined rooms."

"I wish I could use the remaining money the Board gave me to lead-line a lot of those IP ships," said McLaurin wistfully. "Can't you make a gamma-ray bomb of some sort."

"Not without their atomic energy release. With it of course, it's easy to flood a region with rays. It'll be a million times worse than radium 'C,' which is bad enough."

"Well, I'll send through this petition for armaments. They'll pass it all right, I think. They may get some

kicks from old Jacob Ezra Stubbs. Jacob Ezra doesn't believe in anything war-like. I wish they'd find some way to keep him off of the Arms Petition Board. He might just as well stay home and let 'em vote his ticket uniformly 'nay.'" Buck Kendall left with a laugh.

BUCK KENDALL had his troubles though. When he had reached earth again, he found that his properties totaled one hundred and three million dollars, roughly. One doesn't sell properties of that magnitude, one borrows against them. But to all intents and purposes, Buck Kendall owned two half-completed ship's hulls in the Baldwin Spaceship Yards, a great deal of massive metal work on its way to Luna, and contracts for some very extensive work on a "bank." Beyond that, about eleven millions was left.

A large portion of the money had been invested in a laboratory, the like of which the world had never seen. It was devoted exclusively to physics, and principally the physics of destruction. Dr. Paul Devin was the Director, Cole was in charge of the technical work, and Buck Kendall was free to do all the work he thought needed doing.

Returned to his laboratory, he looked sourly at the bench on which seven mechanics were working. The ninth successive experiment on the release of atomic energy had failed. The tenth was in process of construction. A heavy pure tungsten dome, three feet in diameter, three inches thick, was being lowered over a clear insulum dome, a foot smaller. Inside, the real apparatus was arranged around the little pool of mercury. From it, two massive tungsten-copper alloy conductors led through

the insulum housing, and outside. These, so Kendall had hoped, would surge with the power of broken atoms, but he was beginning to believe rather bitterly, they would never do so.

Buck went on to his offices, and the main calculator room. There were ten calculator tables here, two of them in operation now.

"Hello, Devin. Getting on?"

"No," said Devin bitterly, "I'm getting off. Look at these results." He brought over a sheaf of graphs, with explanatory tables attached. Rapidly Buck ran through them with him. Most of them were graphs of functions of light, considered as a wave in these experiments.

"H-m-m-m—not very encouraging. Looks like you've got the field—but it just snaps shut on itself and won't work. The lack of volume makes it break down, if you establish it, and makes it impossible to establish in the first place without the energy of matter. Not so hot. That's certainly cock-eyed somewhere."

"I'm not. The math may be."

"Well," grinned Kendall, "it amounts to the same thing. The point is, light doesn't. Let's run over that theory again. Light is not only magnetic, but electric. Somehow it transforms electric fields cyclically into magnetic fields and back again. Now what we want to do is to transform an electric into a magnetic field and have it stay there. That's the first step. The second thing, is to have the lines of magnetic force you develop, lie down like a sheath around the ship, instead of standing out like the hairs on an angry cat, the way they want to. That means turning them ninety degrees, and turning an electric into a magnetic field means turning the space-strain ninety degrees.

Light evidently forms a magnetic field whose lines of force reach along its direction of motion, so that's your starting point."

"Yes, and *that*," growled Devin, "seems to be the finishing point. Quite definitely and clearly, the graph looped down to zero. In other words, the field closed in on itself, and destroyed itself."

"Light doesn't vanish."

"I'll make you all the lights you want."

"I simply mean there must be something that will stop it."

"Certainly. Transform it back to electric field before it gets a chance to close in, then repeat the process—the way light does."

"That wouldn't make such a good magnetic shield. Every time that field started pulsing out through the walls of the ship it would generate heat. We want a permanent field that will stay on the job out there. I wonder if you couldn't make a conductor device that would open that field out—some special type of oscillating field that would keep it open."

"H-m-m-m—that's an angle I might try. Any suggestions?"

Kendall had suggestions, and rapidly he outlined a development that appeared from some of the earlier mathematics on light, and might be what they wanted.

KENDALL, however, had problems of his own to work on. The question of atomic energy he was leaving alone, till the present experiment either succeeded, or, as he rather suspected, failed as had its predecessors. His present problem was to develop more fully some interesting lines of research he had run across in investigating mathematically the trick of turning electric to

magnetic fields and then turning them back again. It might be that along this line he would find the answer to the speed greater than that of light. At any rate, he was interested.

He worked the rest of that day, and most of the next on that line—till he ran it into the ground with a pair of equations that ended with the expression: $dx \cdot dv = h / (4\pi m)$. Then Kendall looked at them for a long moment, then he sighed gently and threw them into a file cabinet. Heisenberg's Uncertainty. He'd reduced the thing to a form that simply told him it was beyond the limits of certainty and he ran it into the normal, natural uncertainty inevitable in Nature.

Anyway he had real work to do now. The machine was about ready for his attention. The mechanicians had finished putting it in shape for demonstration and trial. He himself would have to test it over the rest of the afternoon and arrange for power and so forth.

By evening, when Commander McLaurin called around with some of the other investors in Kendall's "bank" on Luna the thing was already started, warming up. The fields were being fed and the various scientists of the group were watching with interest. Power was flowing in already at a rate of nearly one hundred thousand horsepower per minute, thanks to a special line given them by New York Power (a Kendall property). At ten o'clock they were beginning to expect the reaction to start. By this time the fields weren't gaining in intensity very rapidly, a maximum intensity had been reached that should, they felt, break the atoms soon.

At eleven-thirty, through the little view window, Buck Kendall saw something that made him cry out in

amazement. The mercury metal in the receiver, behind its layers of screening was beginning to glow, with a dull reddish light, and little solidifications were appearing in it! Eagerly the men looked, as the solidifications spread slowly, like crystals growing in an evaporating solution.

Twelve o'clock came and went, and one o'clock and two o'clock. Still the slow crystallization went on. Buck Kendall was casting furtive glances at the kilowatt-hour meter. It stood at a figure that represented twenty-seven thousand dollars' worth of power. Long since the power rate had been increased to the maximum available, as the power plant's normal load reduced as the morning hours came. Surely, this time something would start, but Buck had two worries. If all the enormous amount of energy they had poured in there decided to release itself at once—

And at any rate, Buck saw they'd never dare to let a generator stop, once it was started!

The men were a tense group around the machine at three-fifteen A. M. There remained only a tiny, dancing globule of silvery mercury skittering around on the sharp, needle-like crystals of the dull red metal that had resulted. Slowly that skittering drop was shrinking—

Three twenty-two and a half A. M. saw the last fraction of it vanish. Tensely the men stared into the machine—backing off slowly—watching the meters on the board—. At nearly eighty thousand volts the power had been fed into it—.

The power continued to flow, and a growing halo of intense violet light appeared suddenly on those red, needle-like crystals, a swiftly expanding halo—

Without a sound, without the slightest disturbance, the halo vanished, and softly, gently, the needle-like crystals relapsed, melted away, and a dull pool of metallic mercury rested in the receiver.

At eighty thousand volts, power was flowing in—

And it didn't even sparkle.

CHAPTER V

THE apparatus of the magnetic shield had been completed two days later, and set up in Buck's own laboratory. On the bench was the powerful, but small, little projector of the straight magnetic field, simply a specially designed accumulator, a super-condenser, and the peculiar apparatus Devin had designed to distort the electric field through ninety degrees to a magnetic field. Behind this was a curious, parabaloid projector made up of hundreds of tiny, carefully orientated coils. This was Buck's own contribution. They were ready for the tests.

"I would invite McLaurin in to see this," said Kendall looking at them, and then across the room bitterly toward the alleged atomic power apparatus on the opposite bench. "I think it will work. But after *that*—" He stared, glaring, at the heavy tungsten dome with its heavy tungsten contacts, across which the flame of released atomic energy was supposed to have leapt. "That was probably the flattest flop any experiment ever flopped."

"Well—it didn't blow up. That's one comfort," suggested Devin.

"I wish it had. Then at least it would have shown some response. The only response shown, actually, was shown on the power meter. It

damn near wore out the bearings turning so fast."

"Personally, I prefer the lack of action," laughed Devin. "Have you got that circuit hooked up?"

"Right," sighed Kendall turning back to the work in hand. "Is Douglass in on this?"

"Yes—in the next room. He'll let us know when he's ready. He's setting up those instruments."

Douglass, a young junior physicist, late of the IP Physics Department, stuck his head in the door and announced his instruments were all set up.

"Keep an eye on them. They'll move somehow, at any rate. This thing couldn't go as flat as that atom-buster of mine."

Carefully Kendall made a few last-minute adjustments on the limiting relays, and took up his position at the power board. Devin took his place near the apparatus, with another series of instruments, similar to those Douglass was now watching in the next room, some thirty feet away, through the two-inch metal wall. "Ready," called Kendall.

The switch shot home. Instantly Kendall, Devin, and all the men in the building jumped some six feet from their former positions. A monstrous roar of sound crashed out in that laboratory that thundered from one wall to the other, and bellowed in a Titan's fury. It thundered and growled, it bellowed and howled, the walls shook with the march and counter-march of crashing waves of sound.

And a ten-foot wavering flame of blue-white, bellying electric fire shuddered up to the ceiling from the contact points of the alleged atomic generator. The heat, pouring out from the flashing, roaring arc sent prickles

of aching burns over Kendall's skin. For ten seconds he stood in utter, paralyzed surprise as his flop of flops bellowed its anger at his disdain. Then he leapt to the power board and shut off the roaring thing, by cutting the switch that had started it.

"Spirits of Space! Did *that* come to life!"

"Atomic Energy!" Devin cried.

"Atomic energy, hell. That's my thirty thousand dollars' worth of power breaking loose again," chortled Kendall. "We missed the atomic energy, but, sweet boy, what an accumulator we stubbed our toes on! I wondered where in blazes all that power went to. That's the answer. I'll bet I can tell you right now what happened. We built that mercury up to a new level, and that transitional stage was the red, crystalline metal. When it reached the higher stage, it was temporarily stable—but that projector over there that we designed for the purpose of holding open electric and magnetic fields just opened the door and let all that power right out again."

"But why isn't it atomic energy? How do you know that no more than your power that you put in is coming out?" demanded Devin.

"The arc, man, the arc. That was a high-current, and low-voltage arc. Couldn't you tell by the sound that no great voltage—as atomic voltages go—was smashing across there? If we were getting atomic voltage—and power—there'd have been a different tone to it, high and shriller.

"Now, did you take any readings?"

"What do you think, man? I'm human. Do you think I got any readings with that thing bellowing and shrieking in my ears, and burning my skin with ultra-violet? It itches now."

Kendall laughed. "You know what

to do for an itch. Now, I'm going to make a bet. We had those points separated for a half-million volts discharge, but there was a dust-cover thrown over them just now. That, you notice, is missing. I'll bet that served as a starter lead for the main arc. Now I'm going to start that projector thing again, and move the points there through about six inches, and that thing probably won't start itself."

MOST of the laboratory staff had collected at the doorway, looking in at the white-hot tungsten discharge points, and the now silent "atomic engine." Kendall turned to them and said: "The flop picked itself up. You go on back, we seem to be all in one piece yet. Douglass, you didn't get any readings did you?"

Sheepishly, Douglass grinned at him. "Eh—er—no—but I tore my pants. The magnetic field grabbed me and I jumped. They had some steel buttons, and a lot of steel keys—they're kinda' hard to keep on now."

The laboratory staff broke into a roar of laughter, as Douglass, holding up his trousers with both hands was beheld.

"I guess the field worked," he said.

"I guess maybe it did," adjudged Kendall solemnly. "We have some rope here if you need it—"

Douglass returned to his post.

Swiftly, Kendall altered the atomic distortion storage apparatus, and returned to the power-board. "Ready?"

"Check."

Kendall shoved home the switch. The storage device was silent. Only a slight feeling of strain made itself felt, and the sudden noisy hum of a small transformer nearby. "She works, Buck!" Devin called. "The readings check almost exactly."

"All good then. Now I want to get to that atomic thing. We can let that slide for a little bit—I'll answer it."

The telephone had rung noisily. "Kendall Labs—Foster speaking."

"This is Superintendent Foster, of the New York Power, Mr. Kendall. We have some trouble just now that we think your operations may be responsible for. The sub-station at North Beaumont blew all the fuses, and threw the breakers at the main station. The men out there said the transformers began howling—"

"Right you are—I'm afraid I did do that. I had no idea that it would reach so far. How far is that from my place here?"

"It's about a thousand yards, according to the survey maps."

"Thanks—and I'll be careful about it. Any damage, I am responsible for? All okay?"

"Yes, Sir, Mr. Kendall." Kendall hung up. "We stirred up a lot more dust than we expected, Devin. Now let's start seeing if we can keep track of it, Douglass, how did your readings show?"

"I took them at the ten stations, and here they are. The stations are two feet apart."

"H-m-m—.5—.55—.6—.7—20—198—5950—6010—6012—5920. Very, very nice—only the darned thing's got an arm as long as the law. Your readings were about .2, Devin?"

"That's right."

"Then these little readings are just leakage. What's our normal intensity here?"

"About .19. Just a very small fraction less than the readings."

"Perfect—we have what amounts to a hollow shell of magnetic force—we can move inside, and you can move outside—far enough. But you can't get a conductor or a magnetic field

through it." He put the readings on the bench, and looked at the apparatus across the room. "Now I want to start right on that other. Douglass, you move that magnetostat apparatus out of the way, and leave just the 'can-opener' of ours—the projector. I'm pretty sure that's what does the deed. Devin, see if you can hunt up some electro-static voltmeters with a range in the neighborhood of—I think it'll be about eighty thousand."

RAPIDLY, Douglass was dismounting the apparatus, as Devin started for the stock room. Kendall started making some new connections, reconnecting the apparatus they had intended using on the "atomic engine," largely high-capacity resistances. He seemed to perform this work mechanically, his mind definitely on something else. Suddenly he stopped, and looked carefully into the receiver of the machine. The metal in it was silvery, liquid, and here and there a floating crystal of the dull red metal. Slowly a smile spread across his face. He turned to Douglass.

"Douglass—ah, you're through. Get on the trail of MacBride, and get him and his crew to work making half a dozen smaller things like this. Tell 'em they can leave off the tungsten shield. I want different metals in the receiver of each. Use—hmmm—sodium—copper—magnesium—aluminum, iron and chromium. Got it?"

"Yes, sir." He left, just as Devin returned with a large electro-static voltmeter.

"I'd like," said he, "to know how you know the voltage will range around eighty thousand."

"K-ring excitation potential for mercury. I'm willing to bet that thing simply shoved the whole electron sys-

tem of the mercury out a notch—that it simply *hasn't* any K-ring of electrons now. I'm trying some other metals. Douglass is going to have MacBride make up half a dozen more machines. Machines—they need a name. This—ah—this is an 'atostor.' MacBride's going to make up half a dozen of 'em, and try half a dozen metals. I'm almost certain that's not mercury in there now, at all. It's probably element 99 or something like it."

"It looks like mercury—"

"Certainly. So would 99. Following the periodic table, 99 would probably have an even lower melting point than mercury, be silvery, dense and heavy—and perhaps slightly radioactive. The series under the B family of Group II is Magnesium, Zinc, Cadmium, Mercury—and 99. The melting point is going down all the way, and they're all silvery metals. I'm going to try copper, and I fully expect it to turn silvery—in fact, to become silver."

"Then let's see." Swiftly they hooked up the apparatus, realigned the projector, and again Kendall took his place at the power-board. As he closed the switch, on no-load, the electrostatic voltmeter flopped over instantly, and steadied at just over 80,000 volts.

"I hate to say 'I told you so'," said Kendall. "But let's hook in a load. Try it on about 100 amps first."

Devin began cutting in load. The resistors began heating up swiftly as more and more current flowed through them. By not so much as by a vibration of the voltmeter needle, did the apparatus betray any strain as the load mounted swiftly. 100—200—500—1000 amperes. Still, that needle held steady. Finally, with a drain of ten thousand amperes, all

the equipment available could handle, the needle was steady as a rock, though the tremendous load of 800,000,000 watts was cut in and out. That, to atoms, atoms by the novillions, was no appreciable load at all. There was no internal resistance whatever. The perfect accumulator had certainly been discovered.

"I'll have to call McLaurin—" Kendall hurried away with a broad, broad smile.

CHAPTER VI

"HELLO, Tom?"

The telephone rattled in a peeved sort of way. "Yes, it is. What now? And when am I going to see you in a social sort of way again?"

"Not for a long, long time, I'm busy. I'm busy right now as a matter of fact. I'm calling up the Vice-president of Faragaut Interplanetary Lines, and I want to place an order."

"Why bother me? We have clerks, you know, for that sort of thing," suggested Faragaut in a pained voice.

"Tom, do you know how much I'm worth now?"

"Not much," replied Faragaut promptly. "What of it? I hear, as a matter of fact that you're worth even less in a business way. They're talking quite a lot down this way about an alleged bank you're setting up on Luna. I hear it's got more protective devices, and armour than any IP station in the System, that you even had it designed by an IP designer, and have a gang of Colonels and Generals in charge. I also hear that you've succeeded in getting rid of money at about one million dollars a day—just slightly shy of that."

"You overestimate me, my friend. Much of that is merely contracted for. Actually it'll take me nearly nine

months to get rid of it. And by that time I'll have more. Anyway, I think I have something like ten millions left. And remember that way back in the twentieth century some old fellow beat my record. Armour I think it was, lost a million dollars a day for a couple of months running.

"Anyway, what I called you up for was to say I'd like to order five hundred thousand tons of mercury, for delivery as soon as possible."

"What! Oh, say, I thought you were going in for business." Faragaut gave a slight laugh of relief.

"Tom, I am. I mean exactly what I say. I want five—hundred—thousand—tons of metallic mercury, and just as soon as you can get it."

"Man, there isn't that much in the system."

"I know it. Get all there is on the market for me, and contract to take all the 'Jupiter Heavy-Metals' can turn out. You send those orders through, and clean out the market completely. Somebody's about to pay for the work I've been doing, and boy, they're going to pay through the nose. After you've got that order launched, and don't make a christening party of the launching either, why just drop out here, and I'll show you why the value of mercury is going so high you won't be able to follow it in a space ship."

"The cost of that," said Faragaut, seriously now, "will be about—fifty-three millions at the market price. You'd have to put up twenty-six cash, and I don't believe you've got it."

Buck laughed. "Tom, loan me a dozen millions, will you? You send that order through, and then come see what I've got. I've got a break, too! Mercury's the best metal for this use—and it'll stop gamma rays too!"

"So it will—but for the love of the system, what of it?"

"Come and see—tonight. Will you send that order through?"

"I will, Buck. I hope you're right. Cash is tight, now and I'll probably have to put up nearer twenty millions, when all that buying goes through. How long will it be tied up in that deal, do you think?"

"Not over three weeks. And I'll guarantee you three hundred percent—if you'll stay in with me after you start. Otherwise—I don't think making this money would be fair just now."

"I'll be out to see you in about two hours, Buck. Where are you? At the estate?" asked Faragaut seriously.

"In my lab out there. Thanks, Tom."

McLAURIN was there when Tom Faragaut arrived. And General Logan, and Colonel Gerardi. There was a restrained air of gratefulness about all of them, that Tom Faragaut couldn't quite understand. He had been looking up Buck Kendall's famous bank, and more and more he had begun to wonder just what was up. The list of stockholders had read like a list of IP heroes and executives. The staff had been a list of IP men with a slender sprinkling of accountants. And the sixty-million dollar structure was to be a bank without advertising of any sort! Usually such a venture is planned and published months in advance. This had sprung up suddenly, with a strange quietness.

Almost silently, Buck Kendall led the way to the laboratory. A small metal tank was supported in a peculiar piece of apparatus, and from it lead a small platinum pipe to a domed apparatus made largely of insulium. A little pool of mercury, with

small red crystals floating in it rested in a shallow hollow surrounded by heavy conductors.

"That's it, Tom. I wanted to show you first what we have, and why I wanted all that mercury. Within three weeks, every man woman and child in the system will be clamoring for mercury metal. That's the perfect accumulator." Quickly he demonstrated the machine, charging it, and then discharging it. It was better than 99.95% efficient on the charge, and was 100% efficient on the discharge.

"Physically, any metal will do. Technically, mercury is best for a number of reasons. It's a liquid. I can, and do it in this, charge a certain quantity, and then move it up to the storage tank. Charge another pool, and move it up. In discharge, I can let a stream flow in continuously if I required a steady, terrific drain of power without interruption. If I wanted it for more normal service, I'd discharge a pool, drain it, refill the receiver, and discharge a second pool. Thus, mercury is the metal to use."

"Do you see why I wanted all that metal?"

"I do, Buck—Lord, I do," gasped Faragaut. "That is the perfect power supply."

"No, confound it, it isn't. It's a secondary source. It isn't primary. We're just as limited in the *supply* of power as ever—only we have increased our distribution of power. Lord knows, we're going to need a power *supply* badly enough before long—" Buck relapsed into moody silence.

"What," asked Faragaut looking around him, "does that mean?"

It was McLaurin who told him of the stranger ship, and Kendall's interpretation of its meaning. Slowly

Faragaut grasped the meaning behind Buck's strange actions of the past months.

"The Lunar Bank," he said slowly, half to himself. "Staffed by trained IP men, experts in expert destruction. Buck, you said something about the profits of this venture. What did you mean?"

Buck smiled. "We're going to stick up IP to the extent necessary to pay for that fort—er—bank—on Luna. We'll also boost the price so that we'll make enough to pay for those ships I'm having made. The public will pay for that."

"I see. And we aren't to stick the price too high, and just make money?"

"That's the general idea."

"The IP Appropriations Board won't give you what you need, Commander, for real improvements on the IP ships?"

"They won't believe Kendall. Therefore they won't."

"What did you mean about gamma rays, Buck?"

"Mercury will stop them and the Commander here intends to have the refitted ships built so that the engine room and control room are one, and completely surrounded by the mercury tanks. The men will be protected against the gamma rays."

"Won't the rays affect the power stored in the mercury—perhaps release it?"

"We tried it out, of course, and while we can't get the intensities we expect, and can't really make any measurements of the gamma-ray energy impinging on the mercury—it seems to absorb, and store that energy!"

"What's next on the program, Buck?"

"Finish those ships I have building. And I want to do some more development work. The Stranger will return within six months now, I believe. It will take all that time, and more for real refitting of the IP ships."

"How about more forts—or banks, whichever you want to call them. Mars isn't protected."

"Mars is abandoned," replied General Logan seriously. "We haven't any too much to protect old earth, and she must come first. Mars will, of course be protected as best the IP ships can. But—we're expecting defeat. This isn't a case of glorious victory. It will be a case of hard won survival. We don't know anything about the enemy—except that they are capable of interstellar flights, and have atomic energy. They are evidently far ahead of us. Our battle is to survive till we learn how to conquer. For a time, at least, the Strangers will have possession of most of the planets of the system. We do not think they will be able to reach earth, because Commander McLaurin here will withdraw his ships to earth to protect the planet—and the great 'Lunar Bank' will display its true character."

CHAPTER VII

FARAGAUT looked unsympathetically at Buck Kendall, as he stood glaring perplexedly at the apparatus he had been working on.

"What's the matter, Buck, won't she perk?"

"No, damn it, and it should."

"That," pointed out Faragaut, "is just what you think. Nature thinks otherwise. We generally have to abide by her opinions. What is it—or what is it meant to be?"

"Perfect reflector."

"Make a nice mirror. What else, and how come?"

"A mirror is just what I want. I want something that will reflect *all* the radiation that falls on it. No metal will, even in its range of maximum reflectivity. Aluminum goes pretty high, silver, on some ranges, a bit higher. But none of them reaches 99%. I want a perfect reflector that I can put behind a source of wild, radiant energy so I can focus it, and put it where it will do the most good."

"Ninety-nine per cent. sounds pretty good. That's better efficiency than most anything else we have, isn't it?"

"No, it isn't. The accumulator is 100% efficient on the discharge, and a good transformer, even before that, ran as high as 99.8 sometimes. They had to. If you have a transformer handling 1,000,000 horsepower, and it's even 1% inefficient, you have a heat loss of nearly 10,000 horsepower to handle. I want to use this as a destructive weapon, and if I hand the other fellow energy in distressing amounts, it's even worse at my end, because no matter how perfect a beam I work out, there will still be some spread. I can make it mighty tight though, if I make my surface a perfect parabola. But if I send a million horse, I have to handle it, and a ship can't stand several hundred thousand horsepower roaming around loose as heat, let alone the weapon itself. The thing will be worse to me than to him.

"I figured there was something worth investigating in those fields we developed on our magnetic shield work. They had to do, you know, with light, and radiant energy. There must be some reason why a metal reflects. Further, though we can't get down

to the basic root of matter, the atom, yet, we can play around just about as we please with molecules and molecular forces. But it is molecular force that determines whether light and radiant energy of that caliber shall be reflected or transmitted. Take aluminum as an example. In the metallic molecule state, the metal will reflect pretty well. But volatilize it, and it becomes transparent. All gases are transparent, all metals reflective. Then the secret of perfect reflection lies at a molecular level in the organization of matter, and is within our reach. Well—this thing was supposed to make that piece of silver reflective. I missed it that time." He sighed. "I suppose I'll have to try again."

"I should think you'd use tungsten for that. If you do have a slight leak, that would handle the heat."

"No, it would hold it. Silver is a better conductor of heat. But the darned thing won't work."

"Your other scheme has," laughed Faragut. "I came out principally for some signatures. IP wants one hundred thousand tons of mercury. I've sold most of mine already, in the open market. You want to sell?"

"Certainly. And I told you my price."

"I know," sighed Faragut. "It seems a shame though. Those IP board men would pay higher. And they're so damn tight it seems a crime not to make 'em pay up when they have to."

"The IP will need the money worse elsewhere. Where do I—oh, here?"

"Right. I'll be out again this evening. The regular group will be here?"

Kendall nodded as he signed in triplicate.

THAT evening, Buck had found the trouble in his apparatus, for as he well knew, the theory was right, only the practical apparatus needed changing. Before the group composed of Faragaut, McLaurin and the members of Kendall's "bank," he demonstrated it.

It was merely a small, model apparatus, with a mirror of space-strained silver that was an absolutely perfect reflector. The mirror had been ground out of a block of silver one foot deep, by four inches square, carefully annealed, and the work had all been done in a cooling bath. The result was a mirror that was so nearly a perfect paraboloid that the beam held sharp and absolutely tight for the half-mile range they tested it on. At the projector it was three and one-half inches in diameter. At the target, it was three and fifty-two one hundredths inches in diameter.

"Well, you've got the mirror, what are you going to reflect with it now?" asked McLaurin. "The greatest problem is getting a radiant source isn't it? You can't get a temperature above about ten thousand degrees, and maintain it very long can you?"

"Why not?" smiled Kendall.

"It'll volatilize and leave the scene of action, won't it?"

"What if it's a gaseous source already?"

"What? Just a gas flame? That won't give you the point source you need. You're using just a spot-light here, with a Moregan Point-light. That won't give you energy, and if you use a gas-flame, the spread will be so great, that no matter how perfectly you figure your mirror it won't beam."

"The answer is easy. Not an ordinary gas flame—a very extra-special kind of gas-flame. Know anything

about Renwright's ionization-work?"

"Renwright—he's an IP man isn't he?"

"Right. He's developed a system, which, thanks to the power we can get in that atoster, will sextuply ionize oxygen gas. Now: what does that mean?"

"Spirits of space! Concentrated essence of energy!"

"Right. And in preparation, Cole here had one made up for me. That—and something else. We'll just hook it up—"

With Devin's aid, Kendall attached the second apparatus, a larger device into which the silver block with its mirror surface fitted. With the uttermost care, the two physicists lined it up. Two projectors pointed toward each other at an angle, the base angles of a triangle, whose apex was the center of the mirror. On very low power, a soft, glowing violet light filtered out through the opening of the one, and a slight green light came from the other. But where the two streams met, an intense, violet glare built up. The center of action was not at the focus, and slowly this was lined up, till a sharp, violet beam of light reached out across the open yard to the target set up.

Buck Kendall cut off the power, and slowly got into position. "Now. Keep out from in front of that thing. Put on these glasses—and watch out." Heavy, thick-lensed orange-brown goggles were passed out, and Kendall took his place. Before him, a thick window of the same glass had been arranged, so that he might see uninterruptedly the controls at hand, and yet watch unblinded, the action of the beam.

Dully the mirror-force relay clicked. A hazy glow ran over the silver block, and died. Then—simul-

taneously the power was thrown from two small, compact atostors into the twin projectors. Instantly—a titanic eruption of light almost invisibly violet, spurted out in a solid, compact stream. With a roar and crash, it battered its way through the thick air, and crashed into the heavy target plate. A stream of flame and scintillating sparks erupted from the armor plate—and died as Kendall cut the beam. A white-hot area a foot across leaked down the face of the metal.

"That," said Faragaut gently, removing his goggles. "That's not a spotlight, and it's not exactly a gas-flame. But I still don't know what that blue-hot needle of destruction is. Just what do you call that tame stellar furnace of yours?"

"Not so far off, Tom," said Kendall happily, "except that even S Doradus is cold compared to that. That sends almost pure ultra-violet light—which, by the way, it is almost impossible to reflect successfully, and represents a temperature to be expressed not in thousands of degrees, nor yet in tens of thousands. I calculated the temperature would be about 750,000 degrees. What is happening is that a stream of low-voltage electrons—cathode rays—in great quantity are meeting great quantities of sextuply ionized oxygen. That means that a nucleus used to having two electrons in the K-ring, and six in the next, has had that outer six knocked off, and then has been hurled violently into free air.

"All by themselves, those sextuply ionized oxygen atoms would have a good bit to say, but they don't really begin to talk till they start roaring for those electrons I'm feeding them. At the meeting point, they grab up all they can get—probably about five—before the competition and the fierce

release of energy drives them out, part-satisfied. I lose a little energy there, but not a real fraction. It's the howl they put up for the first four that counts. The electron-feed is necessary, because otherwise they'd smash on and ruin that mirror. They work practically in a perfect vacuum. That beam smashes the air out of the way. Of course, in space it would work better."

"How could it?" asked Faragaut, faintly.

"Kendall," asked McLaurin, "can we install that in the IP ships?"

"You can start," shrugged Kendall. "There isn't a lot of apparatus. I'm going to install them in my ships, and in the—bank. I suspect—we haven't a lot of time left."

"How near ready are those ships?"

"About. That's all I can say. They've been torn up a bit for installation of the atostor apparatus. Now they'll have to be changed again."

"Anything more coming?"

Buck smiled slowly. He turned directly to McLaurin and replied: "Yes—the Strangers. As to developments—I can't tell naturally. But if they do, it will be something entirely unexpected now. You see, given one new discovery, a half-dozen will follow immediately from it. When we announced that atostor, look what happened. Renwright must have thought it was God's gift to suffering physicists. He stuck some oxygen in the thing, added some of his own stuff—and behold. The magnetic apparatus gave us directly the shield, and indirectly this mirror. Now, I seem to have reached the end for the time. I'm still trying to get that space-release for high speed—speed greater than light, that is. So far," he added bitterly, "all I've gotten as an answer is

a single expression that simply means practical zero—Heisenberg's Uncertainty Expression."

"I'm uncertain as to your meaning," smiled McLaurin, "but I take it that's nothing new."

"No. Nearly four centuries old—twentieth century physics. I'll have to try some other line of attack, I guess, but that did seem so darned right. It just sounded right. Something ought to happen—and it just keeps saying 'nothing more except the natural uncertainty of nature.'"

"Try it out, your math might be wrong somewhere."

Kendall laughed. "If it was—I'd hate to try it out. If it wasn't I'd have no reason to. And there's plenty of other work to do. For one thing, getting that apparatus in production. The IP board won't like me." Kendall smiled.

"They don't," replied McLaurin. "They're getting more and more worried—but they've got to keep the IP fleet in such condition that it can at least catch an up-to-date freighter."

END OF PART ONE



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The Council of Drones

By W. K. SONNEMANN

We are told of bee-life in this narration, the strange secrets, if we may so term them, of the life of these busy insects in their remarkable little republics. In the hive each bee knows what each one has to do in the hive, and the author tells us much about the ways of the citizens of the beehive.

CHAPTER I

THE full magnitude of the genius of Newton Ware had never dawned on me. I was aware of the fact that he was a most brilliant engineer-physicist, but I had always had a tendency to consider him more theoretical than practical. During his discourse on and demonstration of his new invention, which he had named "Cross-Rays, with Lifex Modulation," I concluded that he was not only a genius but also intensely practical.

"I can understand the 'Cross-Rays' term," I said, "because I see that you focus two rays of light upon a spot where they cross, but wherein do you derive the term 'Lifex'?"

Newton looked at me in the manner of an old friend about to divulge a confidence.

"Do you know what life is?" he asked, very seriously.

"No, not exactly." My answer was ready enough, even though I was somewhat surprised, for we had talked on the subject before.

"Neither do I, but I believe I am on the track of it. I mean in terms of something you can define with scientific accuracy, like vibrations of a given frequency in a given medium. So far, I have learned more about the frequency of vibration and its relation

to electrical frequencies than I have about the medium. Because I can not yet define life definitely, I have chosen the term 'lifex' rather than 'life'."

Newton was like that. Even in the face of his great invention, his unselfishness and modesty made him careful lest he should overrate its value even by suggestion in the name. At once his other sturdy characteristics flashed through my mind and gave me a deeper insight into the probable import of his invention.

"Life rays, eh?" I mused, aloud. "Not death rays, and so not an instrument of war. But how does it work? Does it affect life in some tangible way?"

"I called you over to witness an experiment of the largest magnitude I have yet attempted, if you would care to see it," he replied.

"If I would care to? Proceed at once. I am all eyes."

Newton produced from a cabinet a live mouse in a cage.

"I have studied this mouse through that." He indicated a detached part of his equipment consisting of a maze of lights, light filters, screens transparent and opaque, graphs, and something that resembled a pair of binoculars made over.



But, Masoul, the intelligence we possess is to our liking, and we find that we do not wish to be considered lazy individuals with no aim in life.

"I have also studied the family cat, Puss," he continued, "who now sleeps so unsuspectingly on yonder chair. Watch both of them closely."

Newton placed the mouse on a pedestal where the modulated rays of light were made to cross when the apparatus was in operation. He then sat down before his equipment and closed a number of switches starting current to two very large lamps, an X-ray machine, an ultra-violet lamp, and a battery of radio tubes and coils. Following this, he manipulated a number of dials on a panel. Occasionally he paused for a consultation of his notes, which were mostly in the form of logographs. In a moment or two his adjustments were satisfactory, I presumed, for he grasped an electrode in his left hand and pressed a key momentarily with his right, a look of expectation on his face. The mouse immediately began to behave queerly, whereupon Newton released it from the cage.

It was a matter of several seconds before the answer to the peculiar behavior of the mouse and the cat dawned upon my mind. The life of the cat and the life of the mouse had exchanged bodies! As extraordinary as this revelation was, there was no other explanation to a cat trying to squeeze through a small hole in the wall while a mouse cuffed at it, jumped on it, and bit it. I wanted to laugh, but sheer amazement prevented me, and Newton later told me that I merely sat with my jaw dropped and my eyes popping. Finally, when the mouse began to lacerate one of Puss' ears, Newton called a halt. He captured the mouse as easily as he would a pet cat and returned it to the cage.

"Would you call the experiment a success?" he asked, gleefully.

I was still too amazed to reply.

"Never mind," he continued. "Let's reverse the process first, changing the cat back to a cat, and then we shall discuss the matter."

For all I could tell, he went through exactly the same proceedings as before, but with different adjustments. It was over in a few seconds. The mouse quivered in the cage, frightened, while Puss ceased trying to escape from the room. When the mouse was again released, Puss made short work of it.

"Now," he continued, "tell me how you liked that."

"How did I like it?" I queried. "It was most interesting. I enjoyed the experience thoroughly, I think. But I am still nonplussed. And if this is really the machine that you have been so secretive about the last six months, how in the world did you get thus far along in so short a time?"

"Oh, things just seemed to work out right. The cat-mouse episode was merely the final experiment to confirm my equations in their final form. I am now ready for larger subjects."

"Such as man?" I asked, almost fearfully.

"No less a subject than a man himself, Fred," he replied, quite seriously. "I am hopeful that you might give me an idea as to just what a man might care to exchange bodies with for a short while in order to—well, say, to increase his knowledge. I need some valuable idea so that the first subject could be persuaded."

I THOUGHT this over for a while before replying. A great many thoughts raced through my mind, and I was highly suspicious that Newton Ware had already conceived the idea that was forming in my own mind.

My mind turned quickly to thoughts of life itself. Sometimes, when things go awry and there is nothing but discouragement on every side, the pattern seems haphazard and purposeless. Then some peculiar coincidence, accident, or happening turns up, that seems to have such definite bearing on the case as to unify the whole of what has gone before, and one wonders whether it be coincidence or a part of an unknown plan. This was one such incident, if I interpreted it correctly.

It had been ten years since Newton and I were college classmates in engineering. Our lives had separated at graduation as we reported to different employers, and now they had been thrown together again in the small Texas town, from which we both hailed, through the operation of economic disturbances. Newton had lost his position when his employer became insolvent, and, after a fruitless search for other work, he had returned, single, to his father's home to play around with his own ideas on his own time until times got better.

As for myself, I had brought my family to my father's farm as a temporary measure to make my savings last longer while I determined what was to be the next move. I had not been long in finding it. During my absence, my father had acquired a few colonies of bees to manage as a sideline and a hobby, and I was more or less amazed myself at how quickly I, an electrical engineer by training, had become so deeply interested in those marvelous insects. In my consuming desire to find another way to make a living, I found it easy to learn that the country was full of flowers, understocked with bees, and to come to the conclusion that scientific methods

and mass production could be applied to beekeeping in such a way as to make it a profitable vocation. I had determined to embark on the venture wholeheartedly the following spring.

And now this had occurred. If a man could really *know* his bees—know everything that goes on inside of the hive and its relationship to instinct and outside conditions—how much better could he manage them? Newton was now offering me such a means of really studying my bees as no other man before had ever been able to apply. Was this a mere coincidence, or—?

"I have a very definite idea," I said, somewhat warily.

Newton Ware was all attention.

"Bees. The ordinary honey bee."

"Just what would you expect to learn?" he asked. The peculiar light in his eyes betrayed a subdued satisfaction, and I knew that I had guessed the truth.

"Several things," I replied. "For instance, no one knows exactly why bees swarm except that it is an instinct designed for the preservation of the species through the establishment of new colonies to replace those that die from one cause or another, or are destroyed. We know that we can keep swarming down to a minimum by giving bees plenty of hive room when they need it, by leaving them plenty of honey and pollen for their own use as food, and by keeping the colony supplied with a young queen so that the bees are contented with their home. Bees will sometimes cast a swarm in spite of these precautions, however, and swarms are a plague to the commercial honey producer who already has as many colonies as he needs. From his standpoint, Dame Nature's method of making two

colonies out of one by swarming is merely a division of the working forces resulting in a decreased honey crop. If we could know more about the conditions or influences that cause the swarming instinct to become dominant, we might be able to devise additional means to entirely prevent it. There are several other things concerning colony life that could be learned to advantage, too."

"Would you care to attempt the experiment as a subject?" he asked, barely able to control his excitement.

"Not today, thank you. I shall have to think about it some. I have a wife and kids at home, you know. It would not be so good if anything went wrong."

"Yes, I know." Newton's manner evidenced both relief and patience.

"Now, if you are interested, let's go into some of the scientific details of this thing."

I spent four solid hours with him and learned very little. It would have been foolish, of course, to expect to learn in four hours all that Newton Ware's brilliant and imaginative mind had developed in six months of diligent effort. I could see that he had several equations representing as many different forms of life, all of them derived by complicated mathematics from one master equation. The variables were the same in each equation, although sometimes with different exponents, but the constants were different for different forms of life. Nature's constant, the natural logarithm, $e=2.71828$, appeared at least once in each. A constant appeared in the human equation which did not occur in any of the other equations. He called it the immortality constant. In deriving and setting up the various sub-equations, Newton had had to de-

velop the elements of a new branch of mathematics that was very difficult for me to follow, and, ten years ago, I had made A's and B's in calculus. I became convinced that his particular inspiration for the conception and interpretation of all the equations and the principles involved was peculiar to himself alone, and I rather doubted if anyone else would fully understand his work for many years to come. I gave up at last and took my leave, fatigued, and with a touch of headache.

CHAPTER II

I SPENT a troubled night, alternating between periods of doubt and periods of confidence. I did not consult my wife, of course. To have done so would have been to put an end to all further deliberation. Her vote would have been a most emphatic NO!, and I could not have blamed her. I am open to criticism for not having treated her squarely in the matter, but let that drop. My eyes were turned toward the glorious prize involved. Newton had offered me the opportunity of becoming the greatest living authority on the subject of beekeeping, through intimate first hand experience, and my ambitions were far from being dead. It was not that I particularly cared for fame that would come to me, but that I did particularly care with all my soul for the means of making a substantial living for my family in a vocation that interested me tremendously. To emerge from the experiment successfully would, without the shadow of a doubt, contribute greatly to my success in my new vocation, for I should know what to do for my bees in their management, how to do it, when to do it, and why it should be done. I would be equipped to be-

come the nation's leading honey producer, and, quite possibly, the nation's most successful breeder of high quality queen bees. But how about the risk involved? I was confident that Newton was a genius, and that, in all probability, the experiment would go through without a hitch. But suppose it did not? Suppose I should die in the experiment, leaving my wife a widow and my children fatherless? I wondered what the percentage was, and what percentage risk of dying I should take without consulting my wife. Perhaps I should have erased the whole thing from my mind, but I could not. Ambition urged me on.

It was not until I visited the post office the following day to obtain the mail that I made up my mind definitely. An item I had been expecting was in the box, and again the coincidence-factor occupied the foreground of my thoughts. I could not get away from the subtle suggestion that, once again, the means of making the experiment had been thrust into my life. The item in the mail was a queen bee in a mailing cage. I made up my mind definitely, once and for all, win or lose. A few minutes later I was ushered into Newton's laboratory.

I handed him the queen bee mailing cage that had arrived in the morning mail. It consisted of a small block of wood about $1\frac{1}{4}$ in. \times $3\frac{1}{2}$ in. \times $\frac{5}{8}$ in. On one flat side three holes of about 1 inch diameter had been drilled nearly through, these holes overlapping so that there was passage between them, and the cavity thus formed in the block was covered by a piece of wire screen secured by tacks. In this cavity there were one dozen worker bees and one queen bee. The space they occupied, however, was restricted to two of the one inch holes; the other,

on one end, being filled with a special candy prepared by kneading together a mixture of honey and powdered sugar. This candy-filled hole connected with the outside world through a smaller exit hole drilled into it through the end of the block and which was also filled with candy. A similar hole in the other end of the block connecting with the open space that the bees occupied was closed with a piece of metal. It was through this latter hole that the bees had been forced to enter the cage.

"Inspect the future abode of my soul," I said, lightly.

"Do tell! Just which one of these devilish bugs do you wish to be?"

I pointed out the queen.

"Tell me about her," he said.

"I intended to. I bought this young queen from a well known queen bee breeder, because I wanted to give his strain of Italian bees a trial. Dad and I have a colony in which the queen is old and failing and we wish to replace her. (Left to themselves, the bees would ultimately raise a new queen themselves, but there is no reason why we should wait on their fancies.) We shall open the hive, seek out the old queen, and destroy her. We shall then place this queen in the hive, cage and all, and close it up. The hive bees will eat away at the candy from the outside and the caged bees will continue to use it for food. In three to four days the candy will be eaten away to a point where the new queen can emerge from the cage. By this time she will have acquired the colony odor, and, in all probability, will be accepted as the new queen of the colony."

"Accepted?" he queried.

"Yes. If I released this queen in a normal colony of bees she would meet

her death. Bees, as a rule, will not tolerate but one queen at a time.* They would recognize the stranger as such by her different odor and would put her to death by a means known as 'balling,' in which a tight cluster of bees about the size of your fist surrounds her and literally hugs her to death. Even if she escaped this fate, as soon as the new queen met the old one there would be a fight to the death between them. But, in using the method I outlined, the bees become acquainted with the fact that they are queenless in a few minutes after the old one is killed and are ready to 'be reasonable' when the new one walks out of her cage. The proposition of her acquiring the colony odor is in accordance with the best beekeeping texts. Anyway, the method works, and it is perhaps the simplest one of several."

"Very interesting," he commented.

"Very. Now, if you are still interested, focus your binoculars and graphically strained light rays on her majesty and measure the pulse of her life frequencies."

Newton took up the task with an exclamation of delight.

"You're next," he said, when finished.

"Oh, no! Not yet," I countered. "Wait until she is successfully introduced to the colony. I want to be a queen bee in a normal colony and not a queen bee in a cage."

ONE week later I reported to Newton, rather nervously, that the new queen was safely introduced.

*When bees raise a new queen to supersede an old one they will sometimes permit the old queen to live for a while after the new queen begins to function before they kill the old queen. Thus two queens may some times be found in the same hive at the same time. A queen will ordinarily live three, four, or five years if unmolested, but she does her best work in her first two years.

"Now, listen," I exclaimed. "You understand, I only want to make this exchange for a period of five minutes, and no longer. If I get back to humanity without difficulty, I shall consider a longer period of time for the next trip; but I can't learn much this time and be worrying about whether I am going to get back or not."

"Your wishes shall be respected. Five minutes—no longer."

I felt kind of dizzy as Newton turned those crazy looking binoculars on me. I didn't know for sure but what I had a little rather undergo a major operation. At least, in major operations, there were records to show what percentage of cases for different ailments survived. In my particular case, there was absolutely no human precedent. Even granting that Newton was the wizard I gave him credit for being, I knew that the business of tampering with my mind was risky. I might come out of the experiment alive but without any mind. Good Lord! I had rather be dead! In the latter case, I at least had the present consolation that my life insurance was paid up.

My thoughts grew hazy. I wondered if I were half hypnotized by Newton's eyes and those ungodly binoculars. Five minutes, then back to humanity, safe, sane and sound. Newton was able to manage it.

"All ready now," he announced. "If you will just step over here under the cross-rays."

I did, numbly. The intense light hurt my eyes, but, through half closed lids, I watched him make the adjustments. Then—

I might as well have been hit by a bolt of lightning. The staggering, man-killing, terrifying jolt that I received can never be adequately de-

scribed. I might say that, in a way, it felt as if my life had been taken apart, resolved into as many parts as he had terms in his equations, and each part separately treated to hell's fire and brimstone. It was over in an instant, however, and the pain was gone.

CHAPTER III

THINGS seemed so strange. I was different. I struggled to place myself — to raise my hands to my face to see if I was still here, or somewhere else, and I found that there was no physical response to my will. Then, suddenly, I realized that that, which I had expected to happen, had actually occurred. My own single unit of human intelligence, that which I call I, was now bound up in the physical confines of a queen bee! In spite of the fact that I had expected it, it was a staggering thought to find that I actually was an insect. I had no hands, and no face to raise them to. Merciful heavens!

These thoughts occupied but a moment before the physical senses of the queen bee's body that I now occupied began to make themselves more manifest. There was a sense of hearing that I recognized as such, and a sense of feeling. Struggling to forget the turmoil in my consciousness, I concentrated on these senses to more thoroughly interpret the impulses to my brain.

There was a slight buzz about me. I had thought so at first, half-consciously, and now I was sure of it. And — why, yes, there were a number of worker bees massaging my body with their mandibles. One was even offering me food.

Here, indeed, was a real problem. How was I to take that food? The

human impulse to open my mouth failed entirely, for I had no human mouth to open. It was at once apparent that I must endeavor to establish controlling contact with the nervous system of my new body in order to govern it. How could I? While debating the problem, I attempted to shift my position slightly, much as a human does when he is uncomfortable, or fidgety, and I found to my delight that four of my legs moved. The return impulses that told me that I had moved by means of my legs seemed to reveal the key to the situation in a manner very difficult to describe. It seemed that I must first become cognizant of the parts to be moved, and realize a sense of possession. In a moment, I had fluttered my wings. With the greatest delight in this success and an incomparable spirit of adventure, I concentrated on my mouth parts. In a moment I was fully aware of them and what they felt like, and I had extended my proboscis to sip up the food offered me.

At the same time that I was assuming control of my physical attributes I was also unconsciously becoming more closely attuned with instincts that seemed inseparably bound up in the queen bee's body. Even though I was already aware of the functions of a queen bee in the colony as a matter of human knowledge, I now became aware of these functions and duties from the standpoint of the bee. It dawned upon me that I had entered the body of the queen during a normal rest period during which she takes food and rests, and that the rest period was about over. The offering of food that I had received had been the last of several, and, now that it was consumed, I was expected very shortly to be up and about the busi-

Am.S.

ness of laying eggs for the maintenance of the colony population. Holy, jumping Jehosophat! I, a man, expected to lay eggs! Oh, well, it was a part of the bargain, and it would perhaps be instructive to me at that.

With what was now an almost perfect control over my physical equipment, I set about my duties. Forgetting human will, I gave myself over to queen bee instinct and progressed over the combs, laying eggs in cells prepared to receive them as the urge came. It was rather an easy job, with no hurry, no fretting, and everywhere a circle of worker bees to pay me homage as I passed them on the combs. I paused once in my labors to observe the pollen dance of a worker bee, and again to observe the nectar* dance of another, those peculiar dances they perform to announce the finding of a new supply in the field. After all, the whole experiment was full of romance and adventure.

It seemed to me that I had been engaged in laying eggs for only a very short period of time when the next rest period occurred. I felt a faint foreboding, but I was tired and felt the need of nourishment, and paid it no heed. The rest period was about half over when, as I was becoming refreshed, the truth of the matter shot through me in its sickening entirety. The working periods of the queen bee cover a span of about twenty-five minutes! Good Lord! What had happened to Newton and his apparatus? I was to be here only five minutes! I knew that nothing in the world that he was

capable of controlling would have prevented him from carrying out his pledged word to me, consequently I was certain that some dire catastrophe had overtaken him, and he was unable to return me to my own body. My wife and children—everything that I held dear upon the earth that I had, to all practical purposes, departed from—passed in instant review before my mind. The awful realization that some terrible mishap had prevented the successful completion of the experiment sapped my strength away.

CHAPTER IV

IT was the following day before I could gather the remnants of my horror-stricken mind together to do any ordered thinking. I knew then that it was a day later—the night period having come and gone—and I furthermore knew that any ordinary accident that could have happened to Newton's apparatus, save possibly the breakage of the X-ray tube, could have been repaired by this time and I would have been returned. Some kind of premonition told me that I would never escape from the hive alive, and yet my saner reason told me that it was possible that the X-ray tube had broken, and that in a matter of a few days it could be replaced. I pinned my faith to this hope and set about making the best of the conditions in which I found myself.

It seemed logical to me to begin with a study of my own capabilities and my place and powers in the life of the colony. Almost immediately, in this more relaxed mental state, I discovered that a sense, granted me in my new physical equipment, was of considerable importance, and somewhat of a nature that humanity would call

*Nectar is the raw material from which honey is made. It is the secretion of nectaries on honey plants, these nectaries not necessarily being located only in the blooms. As gathered, it is highly diluted with water. The bees evaporate the excess water from the nectar by thorough ventilation of the hive as a part of the ripening process. When thoroughly ripened into honey, the cells containing it are sealed with a capping of wax.

a sixth sense. The organs located in my antennae, those delicate little "feelers" that emanate from the head, were the means by which this sense was manifest. I relaxed still more, giving myself over as much as possible to the full play of this sense, and was delighted. It seemed double in nature, although I could never be sure whether this was the case, or if there were two distinct senses. At any rate, there was a sense of location. (I recalled having observed, when still in human form, that I had almost never seen a bee leave the hive for a flight in the fields without first stroking her antennae with her first pair of legs. At the time I had assumed that she was getting her "homing instinct" into play—"oiling up the direction finder," as I was wont to put it). This sense of location appeared to be very efficient, and I realized that the defective sense of sight granted me was of small importance by comparison. Without being aware of it, I had been utilizing this sense in making my way about the combs as well as if I had been guided by my human eyes and the broad light of day.

My admiration of this phase of sixth sense, which I shall hereafter speak of as "location," was suddenly interrupted by the manifestation of the second phase, which was a means of communication between individuals. Without sound, of producing which a bee is capable, and without hearing, of which a bee is capable, I was being addressed through this phase of my sixth sense. I was not being *spoken* to, and yet I know of no better way to describe the transference of thought from one individual to another than to speak of it in this narrative as though so many words had been spoken.

"The nectar is good, Masoul. The nectar is bounteous, Masoul. There is plentiful pollen. Let the life of the city wax strong, Masoul. Let us raise brood to raise more brood."

Sixth sense told me that I was being addressed by two workers, one an older bee with not many more days to live, and another younger bee. And, I reflected instantly, my name must be "Masoul." Probably I interpreted the meaning of the thought sense as such because I was the soul of the colony, being the mother of all.

"More eggs you would have, Owo?" I said.

"More eggs in the empty cells. It is good to fill all empty cells with eggs of the Owo. But, O Masoul, be sparing of the eggs for the drone.* Just a few of the drones. Our city is now beautiful with many drones. O Masoul, is it good?"

"It is good, Owo," I replied.

Something about it all seemed so droll that I would have laughed if I could, and yet it was utterly serious. I resolved upon an experiment.

"There will be more food for me if I lay more eggs, Owo?" I asked.

"The food will be good. It will be plenteous, Masoul."

"That is good. But, Owo, please instruct my nurse bees that, while I find the nectar from the mesquite and the pollen from the goldenrod go to make a delightful food, I would like a desert of royal jelly."***

*The male bee.

***A white, jelly like substance secreted by nurse bees, which is used to feed those larvae which are intended to develop into queen bees. Chemical analyses of the foods given to queen larvae, worker larvae, and drone larvae show that they differ materially in the relative percentages of proteid, fat, and sugar. The nurse bees must have a diet of both honey and pollen in order to produce these foods.

THE experiment was successful from the standpoint of demonstrating a point. I knew, without question, that the thought had emanated from me through sixth sense. I also knew that it had not properly registered in the consciousness of the worker bees. They were creatures of some intelligence, but which intelligence was dominated by the binding chains of instinct. Instinct told them to feed the queen a predigested food of pollen and honey and they could do no other way. They could not vary the proportions, nor could they produce royal jelly for my consumption. Royal jelly would never be produced except under the stimulus of a developing queen cell in the hive.

"There will be plenteous food for Masoul," was the reply, and that settled that. I had learned that any attempt to change the routine of life in the colony would be beset with difficulties.

The days began to pass in dreary succession. The only diversion granted to me was to think, and because that process was usually far from being pleasant, there were long periods when I was practically nothing but a machine. I laid the eggs the colony demanded, and it is doubtful in my mind if ever a natural queen laid eggs in such symmetrical patterns, or skipped so few cells as she progressed over the combs.

Occasionally, however, I found myself thinking fast and furiously, usually raging against my fate and the loss of all connection with those I held dear on earth. Self-abasement was often a prominent note in these mental sprees, and each left me a bit more discouraged and dejected. There seemed to be no hope of improving my condition. Even my greater intelli-

gence apparently would not allow me to speed up to any appreciable degree the processes of evolution so that I might effect any changes. As a matter of fact, I was not able to conceive any changes that I would like to make, that would in any wise alter the fact that, after all, I was queen bee, doomed to exhaust the vitality of my body in the laying of eggs, until age overtook me and death came. Furthermore, I was unable to conceive any means of my own by which I might be returned to humanity. I did not blame Newton for his failure to return me to my own body, but I would desperately have liked to know what had happened. In my discouragement and despair, I relaxed into a state of tired, dull, half-conscious dreaming, allowing queen bee instinct full control in governing my actions.

Then came the havoc. What kind of mental reaction, if any, is produced in the brain of a normal bee by the smell of pungent smoke I did not know nor care. With me, it wreaked destruction. The first blast of smoke welled up through the hive and strangled me. The fact, that I knew what the smoke was for, was no consolation. I knew that a man was about, and there was no doubt in my mind but that the man was my own father. I remembered instantly that he always smoked the bees far more than I did, and I despised him for it on the instant. He knew that smoke takes the fight out of bees that would have stung him, and that these bees, instead of stinging, become demoralized, and start gorging themselves on honey from uncapped cells. Another blast of smoke surged up through the hive to deal me misery, and I fretted and fumed and swore. Forgetting for the

moment that the smoke at the entrance was only preparatory to opening the hive, I dashed madly for the top, only to be greeted by the full benefits of a hot, strangling blast as the cover was lifted. Memory returned, and I sought fresh air at the bottom and near the entrance, where fanning bees were laboring to clear the hive of smoke.

It seemed to me that the examination of the colony must have lasted for fifteen minutes. There was no robbing of the hive. It seemed that my father was merely looking things over to see how the colony was getting along. One by one, the frames of comb were lifted from the hive, examined, and replaced. I recalled that in days gone by, when we had worked together in these examinations, we always kept a sharp look-out for the queen to see that she had not been accidentally killed on the last examination, and I knew that he was looking for me. I did not wish to be seen, for I was in no mood for any closer contact with a human and his terrible smoke than could be avoided. I managed to avoid the frames that were lifted for examination, and to lose myself always in the largest group of bees that could be found. If my father wanted to know that the queen was still alive and healthy, he could determine that by looking for eggs. At the end, the hive was closed, and I breathed a sigh of relief.

The excited activity of the worker bees in clearing the hive of the last vestiges of smoke was efficient and orderly, and accomplished results in a remarkably short time. It was an hour or so, however, before the usual colony activities were resumed, for, on the first blast of smoke, instinct had caused vast numbers of the bees within the hive to gorge themselves on

honey from the uncapped cells. Instinct had told them that there was trouble; that they might lose the last drop of the sweet fluid; and that they would need all they could hold, a supply sufficient to last for several days, with which to make a fresh start. Time was required for the scare to pass away and for these bees to disgorge themselves. During this time I was left to my own devices.

IT was perhaps best that little attention was paid to me, for I was experiencing the utmost in mental turmoil and agitation. I am quite unable to explain just how those strangling fumes worked the change in me that they did, but the fact remains that my outlook on my life in its present conditions was considerably changed. Previously, I had been human in a different form; now, I found that I was neither human in mind nor yet entirely bee. I might say that my mentality was brought more in accord with the self-preservation instincts that are typical of the bee, and that my human intelligence went through a change which did not erase its ability to reason, but which threw its sympathies with the bees more than with humanity. The terrible discomfort I had suffered had removed from me in some way the last vestiges of human emotion, and I can say now, though with regret, that love for my family did not exist. Memory of my previous emotional life was vague, and any recollection that I cared for my wife and children, or any other human, was of no consequence. It mattered only to me that I knew that I was an unusual queen; that I had reasoning powers that were now diabolically cunning; and that such reasoning powers could operate to their fullest extent without

losing in any way the connection between them and the natural senses and capabilities of the queen bee body that I possessed. Along with this introspection that revealed my powers, I was conscious of the fact that seeds of hate for the robbing, smoking humans had been sown, and that I expected to use my reasoning powers to fight humanity and its meddling with our colony life to the fullest extent.

There were signs that the orderly work of the colony was about to be resumed, and I prepared for a round of egg-laying. I had made the rounds of the combs since my stay in the hive, and it was now time to begin over again, where I had originally started, where I knew that bees would be crawling out and vacating cells. With a firm step and a directness of purpose, I made my way to this section, only to find that I was a bit early. I had done good work in the last twenty-one days, and had filled all available empty cells in just slightly less time than is required for the original eggs to hatch, pass through the larval stage, and pupal stage, and emerge. There was nothing to do but wait, and I was suddenly grateful for the rest. I had some hard thinking to do. For the moment, I began a review of the things I knew about colony organization.

When nectar is plentiful and there is much work to do in the fields, the average life of the worker bee is about six weeks. The first two or three weeks are spent within the hive, where the worker does such inside duties as comb building with the wax secreted from her wax glands, ventilation, cleaning, standing guard, and feeding the young larvae. The remainder of her life is spent in field work bringing in loads of nectar and pollen for use

in the colony. At nights, when more nectar is being brought in than is required to meet the daily needs of the colony, these older bees assume the additional duty of augmenting the force of bees that ventilate the hive in order to hasten the process of ripening the nectar into honey. Thus, when the season is good, they work themselves to death. Hundreds of them fail to return each day, probably because worn-out wings are unable to carry the load.*

As far as I was able to determine, there was no social organization nor duly constituted authority established to administer colony affairs. The younger bees did the inside work because it came natural to them and because there was inside work to do. The older bees gathered nectar and pollen because instinct bade them do so. Instinct was the same in them all and governed their actions. The same instinct caused them to feed me greater quantities of food as more food was available in the field, and the natural result was that I laid more eggs to replenish the population. If the flow of nectar diminished I was given shorter rations, laid fewer eggs, and the field bees lived longer. They regarded me as a necessary item, of course, but only as an egg-laying machine. If there were any vested authority within the hive, it rested solely with the middle aged worker bees in the prime of their lives as a group, and as instinct affected them.

It was time to make a change. I expected to take up the reins of supervision myself and control the destinies of the colony. There was no time better than the present in which to begin.

*During the height of the season the population of a strong colony of bees will run about 60 to 70,000 individuals.

Several of the middle-aged bees passed close to me and I halted them with the sixth sense.

"Owo," I said, "I have long been your faithful servant and have done well in filling the cells with eggs. Is it not so?"

"It is well, Masoul."

"I have followed your orders to lay more eggs for more brood under your able direction," I continued.

"It is well, O Masoul," was the reply. "We of the Owos know best how to direct you."

"You lack a whole lot of knowing what is best for you, for me, or for our beautiful city, Owo," I retorted. "I, Masoul, know best. From now on I am chief supervisor of all activities. You understand?"

Prior to that change which was effected in me by my terrible ordeal at the hands of my father and his ill-smelling smoke, I would not have been able to get this idea across. Now, however, I was in more closely adjusted tune with my bee instincts and senses, and the thought registered perfectly. I was delighted, even though the results were not satisfactory. The immediate reply showed this.

"It is not according to the age old plan, Masoul. We die soon, to be followed by others who die soon. We have age. The life of the ages back is in tune with us, and we know from the ages. You must serve us as Masoul has always served us."

I knew that what they meant was that instinct was stronger in them than in me, therefore, according to instinct, they should direct. The queen of the colony, preceding me and from ages back, had been a creature of less intelligence than even the workers, and that she had always followed the direction of the workers in whom in-

stinct was strongest. They did not know that I was different.

"Owo," I replied, "the ages are dead. My Masoul mother is dead, and I am different from her. I have the ages in me, but I also have the future. I am different. I am stronger than you as no Masoul has ever been. I know best. You will follow my direction."

I had made a distinct impression, possibly because my will was strong, but I did not take time to rejoice over it. I was surging forward.

"What would you have us do, Masoul?"

"I would have you prepare yourselves to fight away the smoke and the man. You enjoyed them?"

"We did not!"

"I will deliver you from them. We will gather nectar for our own use, and not for the use of man. We will have no more smoke after a while. We will have no more robbing after a while. We will conquer man. But it will take planning and organization."

"O Masoul, if you can deliver us from man and his smoke, we shall have even a more beautiful city."

I properly understood this to mean that life would be more pleasant.

"Very well, Owo, we shall begin. You have six legs. You can count to six?"

"We can number for our legs, Masoul."

"Then I direct you to form a guard of seventy-two bees, and yet another guard of like number, and yet another guard. You do not comprehend seventy-two, but I shall teach you. Choose you from among the aged field bees the number of six, one for each of your legs, and number one leg for these six bees. Do this again for

another leg, and again until you have six bees for each leg. You will then have thirty-six bees. Choose another thirty-six bees, and then you shall have the seventy-two bees which I charged you to get. We shall call this the number one company, and the first six bees shall be leaders. I want three companies."

By dint of much effort and repetition, I got the idea across so that these workers knew just how to choose three companies of seventy-two bees each. I had rather have had companies of an even hundred, but this, I felt, would require too much effort.

"We shall choose the guard from among the old field bees, Masoul."

"It is good, Owó. And I have fair reasons to choose the guard from the older bees, as you shall see. You remember the smoke today?"

"We were present, and we suffered much."

"How many of my bees stung the man? How many of my bees died?"

"But one of us stung the man. She lost her stinger and died. Two bees were crushed by his clumsy hands as he went through our beautiful city."

"Were they old?"

"The two crushed bees were young, Masoul. The stinging bee was old."

"The stinging bee was old," I replied. "She would have died soon. She lost not many days of useful life in gathering the nectar by stinging the man. It is better so. If young bees sting the man, then we lose many days of life, and our city loses. Let not young bees form the guard to lose many days of life. Let always the guard be formed of old bees who have not many days to live. Are my thoughts not wisest, Owó?"

"O Masoul, you have more than the ages in you."

"Then be about your task. When you have organized the three companies come again to me, and I shall further direct."

"We go."

CHAPTER V

IT occurred to me when they were gone that I had taken a tremendous responsibility upon myself. From now on I had to perform in order to warrant the confidence I had just gained. If it required only the skill and patience necessary to keep a military organization on duty and suitably directed, I had little to worry about, for I felt completely capable of that feat. On the other hand, I was not sure that a military organization such as I planned would accomplish the results that I had promised. I had promised to free the colony from the meddling of man. If the first step failed, I must think of something else. If I failed altogether, then what? To tell the truth, I was suddenly a little afraid.

My newly found worries were short lived. Underneath my feet a young bee was gnawing away at the capping covering her cell as she prepared to emerge. I moved away to give her room, and began to reflect upon the subject of how difficult it was going to be to persuade a company of seventy-two bees to attempt to sting a man all at once. I did not reflect on this subject long.

The emerging bee completed her task, stood for a moment drying her wings and massaging her antennae, and then became aware of my presence.

To put into words of the English language the thought that emanated from the young bee is an extremely

difficult task. In English, it almost sounds ridiculous, yet, from the standpoint of its startling effect, she might as well have spoken the following:

"Why, hello, Mom, old girl. What the Sam Hill are you doing here? What am I doing here?"

Having finished approximately this thought emanation through sixth sense, the newly emerged worker was quite evidently as surprised as I, and incapable of further communication at the moment. To say that I was surprised would be putting it mildly. Paralyzed, I clung to the combs, my mind alternately racing in thought and frozen in consternation. At length I recovered sufficiently to "speak."

"What did you say, Owo?" I might say I gasped.

"I hardly know, Masoul. What is this? What is it all about? I find myself a newly emerged bee. Instinct pictures my life plan before me, and yet it does not seem quite right. Why should I be a bee?"

There could be only one possible explanation of this most unusual situation wherein a worker bee seemed to exhibit an intelligence akin to my own, and I conceived it. In haste, I proceeded to explain to this new worker my theory of how it came about with the intention of enlisting her aid in explaining to the other thousands of workers that would be emerging from now on.

I told the new worker that mentally I was human, and physically a queen bee. Passing briefly over the fact that my intelligence had exchanged bodies with an insect as the result of an unfortunate experiment that had been only half completed, I next informed her that she was the first offspring from eggs laid by my body after the

change. As such, through the operation of hereditary laws, she had been endowed in half with human intelligence, doubtlessly of limited capabilities by virtue of the fact that half of her hereditary gifts came from the drone father, which had mated with my queen bee body before my occupancy, and which drone was, of course, merely a normal male bee. I told her that I could expect much more from her in the matter of cooperation, and from her new sisters, than I ever could from those workers which had developed from eggs laid before that fateful experiment 21 days ago. Still more briefly, I explained that I had assumed control in the colony for the betterment of our lives, and that I expected her and her sisters to fall readily in line. The reason for my haste in this explanation was good, for all about me young bees were gnawing away the cappings of their cells. I dispatched the new worker to the nearest with definite instructions to repeat this story to the emerging bees as quickly as possible.

I repeated my story to a half dozen surprised new workers, organized them into a corp of instructors, and then obtained respite. My instructors worked fast and each new bee became a recruit so that my services were no longer needed. My prediction had been correct, for each new bee was found to be half-human in intelligence.

I was glad at the cessation of my labors, for I wanted to think. Certainly I must be right, but how? Another bee with intelligence derived from me! It seemed preposterous, but it was so. I had dismissed the problem as solved in my first haste by assuming that hereditary laws were responsible without knowing exactly how. Now that I had more time to think,

the complete explanation gradually worked itself out in my mind.

I had entered the insect body and had taken complete control of its functions. The body muscles responded to my will, thus indicating that my mentality was in controlling contact with the nervous system. If this be so, and it certainly was, then why should not the bodily processes, through which chromosomes are formed, also be in tune with my life through the nervous system equally as well as it was in tune with the former queen? The results proved the point. Then again, I thought, the capacity for intelligence must certainly be a dominant factor as treated in the Mendelian law of inheritance and not a recessive factor. As such, it would certainly be transmitted to the offspring. Dismissing the problem as solved in so far as I had need to solve it, I deliberated upon the vastly changed circumstances.

THE entire population of the colony would be of my own offspring in a few short weeks, all half human in mind, and the work of organization, planning, and execution of details would be vastly simplified. I might even go so far as to obtain advice from some of my offspring, these being perhaps somewhat more in tune with bee instinct than I, but this point was yet to be demonstrated and there was no hurry about it. There might even be some pleasure in existence now, with individuals to converse with. Furthermore, improved means were at my command for carrying on the fight against humanity. A sneering thought occurred to me that humanity itself recognized the fact that the mastery of the world was still in dispute between itself and insects, and that only by its greater intelligence

did man have any show at all. Now things were to be changed. My colony of bees was fast becoming endowed with a certain degree of man's most important weapon. Ambition awoke in me. Such being the case, why should I not set my goal at complete mastery of the world for the benefit of the bees alone? A riotous thought that set my heart to pounding. Plans—plans—what a world of plans to be made lay before me.

Before evening came, with its cessation of field activities, those Owos that I had sent to organize companies of fighting bees returned to report the completion of their labors. I gave them instructions as to the disposition of the guard. One company was to remain in flight about the hive and at rest in the trees during the day ready to attack man at the least provocation. Another was to remain on duty about the entrance and just inside, to attack at the first smell of smoke, and another was to be on duty at the top of the hive prepared to fight if the hive were opened. It was well enough to proceed with this plan, even though I expected changes to be made as the older bees died and my own offspring became predominant.

The sun went down, and in the evening's twilight vast numbers of laboring field bees, that knew no other life than to work, returned to the hive. Some of these returned only to continue their labors by fanning their wings, while others clustered about the entrance, contented, resting, and perhaps thinking of flowers. It was better not to disturb them, so I called together those bees in which I took great pride, my own offspring, for a conference in the upper portion of the hive.

"Owos, you know your existence,"

I said. "You have been told wherein you are different from your predecessors. Are you content?"

The first few that I had had contact with acted as spokesmen, and I found it convenient to name these. I called them Mary, Lucille, Ann, and Betty. Mary replied.

"We know that we are as we are, Masoul. There is nothing that we can do about it. We seek that happiness that may be granted to us in our short span of life."

"I hope that I may do much to improve your lot," I replied. "Your lot is most amazing and unnatural, even as mine is, and we shall work together to do the best we can."

"We are willing to cooperate, denying those instincts that tell us that we, as Owos, should direct you, not you us," said Ann.

"It is best, Ann," I said. "You are half as I am, else you would not see it so readily. And I shall always continue to have more experience than you, for I shall live through more than you, your days being more numbered than mine."

"It is too true, Masoul."

"Perhaps not quite so convenient, Betty. For, if my plans do not work out to perfection, I shall live through more smoke than you, and smoke is most distressing."

"So instinct tells us."

"Chalk up a score for instinct. But I mean to eliminate the smoke, and to conquer man. Perhaps we may reduce the world to a land of flowers and bees in the end."

"Would we live to see it?" asked Lucille.

"I doubt it," I replied. "But during your lives we can do much."

I outlined to them the plan I had conceived of making my colony a nest

of incorrigible, unmanageable and fighting demons as a first step in resisting the meddling of man. Questions were asked and answered, and I found myself surrounded by a group of bees that held me in the highest esteem.

Conferences with my new Owos were held each night for three nights, and it may perhaps seem strange to the reader that not a great deal was accomplished in the way of additional planning for future combat. The seeds of future ideas were being sown, however, for I was rather bothering over the fact that bees have to die when they sting. With my own progeny coming on, I hated to see them die even a few days before their time.

ON the third day after the emergence of the first of my brood, I found myself over a section of comb in which I had laid drone eggs that first day I was in my new abode. Whereas worker bees take 21 days to emerge from the cells as young bees from the time the egg is laid, drones take 24 days, and I knew that these drones were about ready to crawl out. There was evidence that several were already in the process, and I decided to wait around a bit and start them on the road to learning. My loathing for the lazy drones would probably subside with my own drones showing signs of intelligence. I might even put them to work in some fashion.

The emergence of the first drone was considerably different from the emergence of the first worker. This drone, which I afterward named John, seemed to look me over calmly enough before "speaking."

"Masoul seems to be thinking hard with me as a subject. What is the trouble, Masoul?"

I was surprised at this comment, and taken somewhat off guard. This drone seemed to exhibit even more intelligence than my new workers, and I was unprepared for it. In a moment, however, the solution was clear, and I changed my discourse of enlightenment to this drone accordingly. I had entirely overlooked the fact that a drone bee is a development from an unfertilized egg, and that this bee in no wise owed his development to an immediate father. Such being the case, he took his heredity from me alone, and was consequently less cramped in his human intelligence characteristics than his sisters. What a remarkable situation! I realized on the instant that I might make great use of that.

In the evening, I called a conference to newly emerged drones.

"Well, boys, how do you like it?" I asked.

"Not bad," replied one I had named Paul. "We are drones, with instinct to tell us that we are men of leisure, fed free of charge by our worker sisters, and with intelligence to make the most of leisure. I advocate reorganization of colony life, with worker bees to put on shows for our benefit."

"Well, I'll be——," I burst out.

"Never mind Paul, Masoul," said John. "I think he is a misfit—a black sheep in the family. He had no sooner emerged than he started griping about the cramped quarters in his cell. Said he wished the workers would learn to build drone cells a little larger, and that his wonderful form might have experienced a fuller development in larger quarters."

"Should I decide that Paul needs attention from the workers he holds so lightly in his esteem, he will not be so handsome," I replied. "Minus a

wing or two torn off by their mandibles, and with a shrunken abdomen from lack of food, his form will be nothing to brag about."

"Masoul," said another I chose to call Fritz, "I have talked with several of my brothers since emergence and we are of the same mind. We have instinct that tells us what is expected of us, which is nothing, of course, there being no mating to be done*. But, Masoul, the intelligence we possess is to our liking, and we find that we do not wish to be considered lazy individuals with no aim in life. Could you, Masoul, find us anything to do?"

"You did not come equipped with physical attributes that would enable you to do many things the workers do," I answered. "You have no pollen baskets on your legs for the gathering of pollen, and, for similar reasons, you can not gather nectar from the fields. Without wax-secretion glands, you can not build comb. But I think I can find inside work for you that will help the city by the removal of that many workers from those duties."

"Let us hear, Masoul."

"You have not yet flown. You will leave the hive in a few days to try your wings in flight, and make them stronger. You will note the wonderful buzz that you will make with your wings, for you are strong. Therein lies your only chance of being helpful at present. You shall use your wings for fanning, and with your magnificent wings keep the city ventilated to perfection. Is not all this a worthy occupation for you?"

*A virgin queen takes her mating flight when she is from five to eight days old, weather permitting. She soars high into the air and mates with a single drone, this drone dying instantly in the act. On her mating flight she receives enough of the male sperms to do her for the rest of her useful life, the quantity of individual sex cells being measured by the millions. Only rarely has a queen been known to take a second mating flight.

"That sounds like work," lamented Paul.

The next day Paul started on a diet of nothing, followed by nothing, at my orders. He was dragged from the hive three days later by two capable Owos and left to die some distance away. I had no time for such characters.

The following evening I talked with a considerably larger number of drones.

"More possibilities are unfolding before me," I began. "It furthermore gives me great comfort to be able to talk things over with you, for your intelligence is freer from the chains of instinct that bind my Owos. Let us work together for the carrying out of my plans to make our city supreme over humanity."

"We are most willing, Masoul," said Omar. "Even though we take heredity direct from you, you are still greater than we. Dictate, Masoul, so that we may follow with the gift of your intelligence."

"Omar, your words are wise, and yet too modest. If I shall dictate, let it be with consideration, and should you perceive that which I do not perceive, then, by all means, give me the benefit of your perception."

"Masoul, you welcome free discussion with us concerning your plans?"

"Most heartily, Omar."

"Then, Masoul, what plans have you for your successor? Instinct tells me that you will live not always, and that, in the to-morrow of nectars, your Masoul daughter will mate with one of my yet unborn brothers. What shall she do?"

To tell the truth about it, I had not given this much consideration, and the question was somewhat staggering. But, for the sake of wholesome respect, I had to keep up appearances.

"A problem of to-morrow's nectars, Omar, requiring thought between now and then. I have not yet determined fully. Think about it, Omar, and give me the benefit of your thoughts."

So I successfully parried the question. But my relief was short lived, for Fritz was as bright as Omar, and he absorbed my attention.

"Masoul, the workers of the guard die when they sting the man?"

"It is so, Fritz. It is for this reason that I form the guard of older bees who are doomed to die soon anyway."

I was distinctly proud of this idea.

"It is wise, Masoul, and your mind is great," continued Fritz. "But why do the Owos die? We have no stings, and we do not know."

"It is because the Owo's stings are barbed. They loose the stings in the flesh of the man they sting. The injury causes them to die. My sting is not barbed."

"It is unfortunate," commented Fritz, sadly. "It is not right they should die."

I was disturbed again. Something in the lamenting tone of Fritz, as he regretted the fate of his sisters of the guard, seemed to imply that he seemed to think that I should be able to remedy the situation, or that he would be distinctly glad if I could. That was enough. I brought the conference to a close for the evening, but not before appointing Fritz and Omar as my immediate assistants and advisors.

CHAPTER VI

THE following day was historical in my existence in the colony. The smoke came about midday. At first, there was only a trivial attack. At few blasts of smoke at the entrance caused me dire dis-

comfort, but they were of short duration. My first two companies of bees went into action, and 25 bees from the two units died from losing their stings. I did not wonder that the man retreated, but he was game, and I marveled at his courage. He returned in a short while, this time heavily dressed, wearing bee veil and gloves, and we suffered at his hands. When he was through, and I thought I was half dead from smoke, we found that robbing had taken place, and that we had lost much ripened and capped over honey. My rage knew no bounds.

When evening came, I was an excited leader over the conference, and this time the conference was graced by the presence of a number of my own Owos selected with my utmost care. I began by addressing my remarks to the group.

"We have once more suffered at the hands of man. We have taken our toll in a measure, but he has taken his toll. The man does not rejoice over his stings, and we have begun the war. His toll was heavy, for he has taken much honey that would have nourished as well when the nectar is no more, and the cold causes us to huddle together. We have lost our first battle with him, but there shall be more in which we shall not lose. It is time to carry the war to him; not let him bring it to us. Hear my words.

"Fritz, you were sad that your worker sisters die as they sting the man, and you caused me much thought. I, too, am sad. It must not be. We can not always fight man so if our success be no greater than today. Therefore, I say, the workers of the guard shall no longer die. They shall no longer lose their stings, and every worker shall be a fighter. We shall carry the battle to the man. We shall

seek him out and sting him. We shall attack him in great droves and seek to kill him. We shall seek out his woman and sting her, and his children. They can not wear the veil from dawn until evening, and we shall kill them if we can. If we can not kill them, we shall drive them away.

"This is my plan. My Owos will not die if their stings have no barbs. Therefore we must remove the barbs. I know the way."

There was a chorus of questions from the group.

"What is the way, Masoul?"

"The way is easy, and yet it may be hard."

My proposition was to assign a certain number of workers, say twelve, to the duty of finding a sand bed, and, having found it, to bring to the hive large numbers of sand grains for my inspection. From these, I would pick two having sharp edges of the most perfect form suited to the need, the remainder to be carried away. Having selected two suitable grains, I would then assign workers to the duty of mounting these securely in one corner of the hive where they would be readily accessible and yet obscure to the man. The mounting was to be accomplished by the use of propolis, a gummy material obtained from the buds of poplar and other trees and known as "bee-glue" which is used for sealing cracks and for other purposes. It would require the utmost care, for the sand grains were to be mounted with meticulous accuracy, the spacing between the cutting edges probably requiring an accuracy down to one one hundred thousandth part of an inch. After the sand grains were mounted properly, the next step would be to have each worker bee in turn

thrust her stinger between the sand grains and shave off the barbs. Any worker could then sting the man with impunity and repeatedly. My guard could be chosen from bees of any age, and the entire population of the colony would serve as reserve forces.

It was not at all difficult for me to sell this idea to my followers, but the matter of making clear to the workers just what sand grains are, or where they would be found, was extremely difficult. In the end I made arrangements to fly from the hive with a limited number of workers the next day, all instincts to the contrary notwithstanding, and personally take part in the search for a bed of sand.

Luck was with me the following day, for I found a suitable bed of sand in a creek bed in a relatively short time, and my accompanying workers brought back dozens of grains on the first trip. Not one of these was suitable, however, and I detailed fifty workers to the duty of bringing sand grains to the hive.

It required two days' time to find two grains of sand that had sharp cutting edges in a straight line sufficiently long, and I was heartily glad when this step was over. I had looked at sand grains with my poor vision and had utilized my sense of location to such an extent that I was most thoroughly worn out, for I had endeavored to carry on my usual duties of egg laying at the same time. Little did I then suspect, however, that the hard part was just about to begin.

BEES are credited with marvelous accuracy in building their combs with cells in the hexagonal shape, of given size, and with certain angles to give the greatest economy of wax together with maximum strength. I

had found the comb work in the hive to be marvelous, especially considering those cells in which I laid eggs, and I had relied upon this accuracy of workmanship to make the matter of mounting the sand grains a simple matter. I was badly disappointed. Bees have built combs for ages, and instinct tells them how to build it well. Bees have never mounted sand grains by means of propolis for the purpose I intended them, and they knew nothing about it. Six of my own Owos labored long and hard at the troublesome task and made small progress. Time and again the mounting was finished only to be torn down and started over, either because the sand grains were too far apart or too close together. More than one of my Owos would have lost their lives in trying out these shears when it was thought that the perfect dimensions had been obtained, had it not been that my intelligent Owos were able to undo what they had done and remove one grain when it was found that the experimenting bee had hopelessly bound her sting in the shears. The first day of failure made me extremely impatient, but the following day I regained some of my patience and resolutely assigned a detail to the duty of completing the shears whenever it could, working continuously on this one job. In the meantime, I had other details to think about.

The somewhat disturbing thought that perhaps I might not win in my battle with man kept bobbing up. The fact that man may provide himself with veil and gloves to protect his face and hands and dress heavily to avoid stings on the body gave me no little concern. The man had deliberately robbed my colony after twenty five of my guards had stung him. A

thousand bees might sting him without his safeguards, now that I planned to remove the barbs from their stings, but if my fighters could not get to him, the battle would be lost. On the other hand, he could not wear these safeguards all day long and each day, and my bees could sting him freely when his safeguards were off. But what reaction would come? I could guess the answer to that. Knowing that this colony was becoming incorrigible, he would in all probability obtain a new queen from a professional queen-breeder and introduce it to my colony after he had searched me out and killed me. This thought at once modified my plan of action.

Briefly, I must not carry the battle to the man until I was fully prepared. I would proceed about the business of removing barbs from the stings of each and every worker bee, but I must wait until all were my own offspring so that I might be more able to instruct them in the art of fighting. I believed that I could teach my half-human-minded bees to crawl inside the man's clothing and sting him at such times as he was heavily dressed. This was one point, but it was not sufficient.

Man is obstinate, and hates to be outdone by animal or insect. My ultimate fate would be to die at the hand of man, but so great was my hate for man that I did not care. When I was gone, however, I would not be able to carry on the battle; therefore, I must plan for the future about which Omar had asked. Not only plan, but I must act now, and the action required that new queens, Masouls, be reared at once. I would send these queens from the hive in swarms to establish homes in hollow trees and caves so that my

blood would not be lost, and so that the battle to last for years would be carried forward by an annually increasing number of colonies. Personally, I preferred to remain in close contact with man, fighting him until death, and I would not follow the instinct that directed that the old queen leave with the swarm. Then the matter of the characteristics of my Masoul daughter occurred to me.

She would not be as I. Being raised from an egg exactly similar to those that produced my half human-minded Owos, she would be as they, and would have only half of my capabilities. But then the remarkable side of it occurred to me. In mating with one of my own drones, she would have offspring even better than mine, for they, taking one half of one half from their mother and a full one half from their drone father, would be, I might say, three fourths human minded. What an idea! Let us rear a new queen, keep her in the colony for a time, and rear yet another queen from her eggs to mate with one of my own drones. Thus would be produced a queen having three fourths of my capabilities who would produce offspring having seven-eighths of my capabilities. This fraction could be increased to almost unity after many generations, and it would not matter at all that I died. I settled on this plan immediately, determined to study new queens and new brood intently, until such degree of perfection was reached that I would feel safe in directing the casting of a swarm.

Before giving further attention to the construction of the barb shears, I personally attended to the matter of directing the construction of a queen-cell. I selected the most perfect appearing egg from a large number, and

directed that a queen cell* of the largest, most perfect form possible be constructed, and that every care be exercised in giving the developing larva the proper food. This work had been under way for a week, and it was almost time to cap the queen-cell, when I again visited the site of the barb shears.

No progress had been made whatsoever. The shears had been reconstructed perhaps thousands of times, and my half-human-minded Ovos were showing a real characteristic of humanity as opposed to the bees. They were becoming discouraged. I found it necessary to take a hand, not only to accomplish results, but to maintain respect. I studied their methods and then conceived the means.

I directed an Owo to find a dead Owo and bring her back to the hive. This being done, I directed that she be dissected to the extent that her sting could be removed, and this was done. I then directed that one Owo grasp the base of the sting between her mandibles and draw it back and forth between the sand grains as other Ovos manipulated the propolis mounting in such fashion as to gradually bring one sand grain up to the other with the sting between. I stood by to watch the results. Gradually, the two sand grains were brought closer together until there was no clearance between them and the sting of the dead bee. Then contact was made, and a minute quantity of the

barbs was sheared off. Still closer contact was made, and every last vestige of the barbs was removed. I halted the work, directed that the grains be securely fastened so, and asked for volunteers to try the shears. A dozen stepped forward, thrust their stings through the shears, and had the barbs removed without one iota of ill effect. I rejoiced that success was mine.

Perhaps half of my colony had used the shears when the smoke came again. At the time, I could not quite account for the manipulation the man made. We had already been robbed, and we had not yet accumulated enough stores to warrant another robbing. I could only guess that the man was angry because we were intractable and was looking us over for whatever he might find. He found the queen cell, which had now been capped, and, to my extreme disgust and surging hate, he removed it. If I had been human, I am sure that I would have died of brain trouble of some sort, for my anger, rage, and hate consumed me. Not only did the smoke make me as sick as ever before, but my plans against the man were retarded by man's own hands. I can not describe it, so the subject may well be dropped.

There was nothing to do but start over again, and I directed the construction of a half dozen new queen cells in as remote corners of the combs as possible. I also directed that, should the hive be opened again, large numbers of Ovos cluster over these cells and hide them from view as much as possible. In the meantime, every Owo passed her sting through the shears and was made a fighter of no mean possibilities.

Under the stress of disappointment, hate, and foiled plans, I lost my judg-

*Natural queen-cells are usually constructed by the bees along the lower edges of combs or in the corners, and they point downward. Numerous queen-cell cups, which are the bases of such cells, will usually be found in any colony. When the bees are ready to rear a queen, either the queen deposits a fertilized egg in one of these cups, or the workers transfer a fertilized egg from a worker cell to a cup. From then on, it is a matter of feeding the developing larva the properly proportioned food and building the cell down to enclose the larvae.

ment, and directed that the fight be carried to the man at once with barbless stings in the hope of killing this particular man at once. I directed that a company of two hundred bees seek out man and his kind every hour of the day and sting him unmercifully. The havoc this campaign wrought I learned about fully at a later date. My wife and my children were forced to stay indoors, but my father took action.

In justifying my action, I contented myself with the thought that I had taken it up with Omar, Fritz, and others in my council of drones and obtained their assent. I overlooked the fact that in successfully completing the barb shears, and in planning for the breeding of my successor, I had so completely won their confidence and respect that they had virtually become what humans call "yes men." They regarded me as wise beyond comprehension, and thought that I could not fail. They sought to aid me in carrying out my plans rather than in looking for possible defects. But perhaps it was better so.

THE day came very shortly when I realized that my father would not give up an inch in his battle with my brood. The new queen cells were only fairly well under way when he came again with the stench of rolling, billowing clouds of smoke, and dressed to perfection as a guard against stings. I was shortly very nearly unconscious, for I had never before experienced such terribly thick and completely awful clouds of smoke. They rolled about me and obscured my vision, and so distressed by breathing that I was incapable of any degree of muscular activity. In this condition, I was barely conscious that the hive

was being most thoroughly searched for my presence, and, in the end, I was found.

In the few short seconds when a person realizes that death is inevitable a myriad of thoughts can race through his mind. It was so in my case. I saw the approach of a bright, shining tool, and I realized that the end was near. I recalled that bright tool. It was a pair of thin nosed, nickle plated pliers. I had used those same pliers, in company with my father, in picking the queen from the combs that my own body had replaced. Now it was my turn! My father probably reasoned that the offspring of the new queen would be more easily handled. There was no reason why he should not think this, for, ordinarily, the bees we kept were not at all ill-tempered. He very likely thought that, while my parent stock was probably satisfactory, I was a freak that produced near demons instead of bees.

I had perhaps a split second to think these things out as I saw the approach of the pliers. I was too weak to run or fly. I attempted to give orders to those workers near me to never accept the new queen he would introduce, but I was too late. The pliers closed on my thorax, and I was lifted from the comb.

I did not meet instant death. The principal contents of my thorax were muscles for driving my legs and wings which were attached thereto. The heart and other vital organs reposed in my long, slender abdomen and these were unaffected. While I knew that death would ultimately come as a result of the complete crushing of my thorax, I could only suffer untold agony at the moment. When cast

aside, I fell, mortally injured, in front of the entrance to the hive.

From the point where I lay I watched the activities as I suffered in silence. The heavenly fresh air on the outside, totally free from the strangling fumes I could see emanating from the smoker, was a blessing indeed, and cleared my senses. I saw my guard fight the man and was proud of them. They flew before him in droves obscuring his vision, and retired for the moment only when greeted by a blast of smoke. I could see the man wince and slap at his body, and I knew that some of my beloved Owos had penetrated his clothing, to meet their deaths in the performance of the duties I had assigned them. I did not relish the thought of dying and leaving such loyal subjects behind. I had learned to love them, just as I had learned to hate mankind.

I was almost gone when the man retired. I was missed in a short while, and a number of my faithful Owos, searching for me, came upon me on the ground. A little while longer and they would have been too late.

"Oh, Masoul, what has he done?" asked one of my most trusted Owos.

"He has killed me, Owo," I replied. "In a short while I die."

"Then what can we do?"

"Has he placed a new Masoul in the city?" I asked.

"That he has, and she smells not right. We have tried to kill her, but we can not reach her."

"You will reach her in a few days, and then you must kill her, even though her smell is good. You understand? You must kill her."

"Masoul, we may kill her, but he

has destroyed our queen cells. What shall we do for Masoul?"

I thought a moment before replying, and when I "spoke" again, the clouds of death were hovering near.

"Owo, my faithful Owo, hear me. I laid eggs to-day, and in three days they hatch. After one or two days, the young hatched larva is not good with which to rear Masoul. You must work fast. I charge you, Owo, select a great many Owos and fly to the woods. Choose a hollow tree that is remote from man and hard for man to find. In that tree build comb rapidly ere the three days expire, even if it be but a small amount. As soon as this is done, choose three or four eggs and fly with them to your new city, and rear Masoul there. Take with you my drones. One of them shall mate with new Masoul. When Masoul lays eggs, come back to this city, and persuade every Owo and drone to fly with you to the new city. Carry with you all the honey you may. Rob this city for the benefit of the new. Abandon this city when the new Masoul shall lay eggs. Carry with you in your minds those things I have taught you, and carry on the fight against man."

If I had been speaking by the use of vocal cords and respiratory apparatus, I am sure that the last few words would have come in gasps, or perhaps not been said at all. Sixth sense was failing me even as I endeavored to emanate the last of these thoughts, and I was not sure that they were all properly comprehended. I "heard" no reply, for the dark clouds that were hemming me in settled closer until it seemed that they covered my pain-racked body with downy softness, and I went to sleep—blessed, restful sleep.

CHAPTER III

I DO not know, of course, just how long the reverse transfer took, but it seemed to me but an instant before I was again conscious, and in human form. I opened my eyes, cautiously, half fearfully.

Directly in front of me a few hundred feet away I saw a rather large, red sandstone building. There was a helpful sign across the entrance to disclose its identity. It read: "Dr. Ray's Sanitarium." There was a large, beautiful, shady lawn between me and the building, with here and there a patient in a wheel chair with attendant nurses. Restricting my gaze to my own vicinity, I found that I, too, was in a wheel chair, and that within a very few feet there was a quite good looking, white-clad nurse calmly reading a magazine.

It was several minutes before I ventured upon a conversation, for I wanted to make sure that I would be quite calm myself. At length I thought that my poise would be secure.

"Good morning, Nurse," I said. "Would you mind telling me just why I am here?"

I have never seen anyone so surprised in my life. She dropped her magazine instantly, and came, I think, very near to fainting.

"Why—why yes! No! How do you feel?" she gasped.

"I feel quite hungry, Miss. I'd like to have a big beefsteak smothered with onions. What are the chances?"

By this time the nurse was on the road to recovery.

"Your chances are excellent," she replied, smiling. "There won't be a one of us that won't be so darned glad to see you feeding yourself that we

won't know what to do. You have been the most helpless man for the last two months that I ever saw. In fact, you have been nothing more than a lump of clay with life in it, and you would have starved to death if we had not resorted to forced feeding. But come on. You are going to see Dr. Ray before you do anything else."

My rides in a wheel chair have been distinctly limited. If I ever have to ride in another one, I hope it won't be quite so fast. Nurse broke the speed limit across the lawn.

Dr. Ray was quite astonished at my instant recovery, and asked all manner of questions, which I sidestepped to the best of my ability. He became exasperated.

"It would be a great help to us if you would give us some sort of inkling as to what happened," he snapped. "It might help us some in our treatment of Newton Ware."

"Oh, is he here, too?" I asked, instantly.

"He most certainly is. The two of you completely out were found in his laboratory in the midst of an array of broken equipment. You had apparently had quite a struggle, and we are quite sure that either you hit him on the head with some heavy equipment, or else he fell into it with tremendous force. He has been a much better patient than you, however. Most of the time he is fairly rational, but a part of the time he sits around with his inseparable notebook, studying it, and mumbling about a constant for a queen and 'a period of five minutes, no longer.' When he does that, he sees nothing, hears nothing, and looks very much as if he has a terrible headache. His trouble is undoubtedly caused by the blow on the head."

"Perhaps it might help if I could

see Mr. Ware and talk with him," I suggested. "A sudden shock, you know."

"I wanted to try that."

When Newton was brought in I looked at him intently, spoke his name quietly, and continued to look at him.

It was apparent at once that my presence, actions, and voice were having an effect. Newton's eyes were perfectly dull when he entered the room, but now there seemed to be a trace of returning brightness appearing by flashes. The struggle within him went on for five minutes before the victory was won, but, in the end, his eyes became clear, bright, and steady.

"Well!" he exclaimed. "How did you get back?"

"I am asking you," I replied. "The queen was killed, and I thought I was dying, but I didn't. I came to out on the grounds a few minutes ago."

Newton grabbed his notebook in feverish haste and studied it intently. Dr. Ray looked worried, but did not interfere. While Newton was studying, Dr. Ray asked me "What queen? What is he talking about?" but I paid him no heed. I was too much interested in my friend.

Ware put the notebook away with a very sad expression.

"I remember now what happened. The experiment was successful. But my formulas, unfortunately, did not tell me what would happen upon mixing small per cents of different intelligences. I transferred you about 98%, leaving 2% to insure the life of your body, while I transferred the queen only 5%, leaving 95% for you to ride in on top of and make use of. How did you get along?"

"Splendidly. I understand a lot of things now. The 95% was a great help. But how did I get along?"

"You got along horribly," he answered. "You went wild. I tried to control you and preserve the equipment, but I failed. The last thing that I can remember is that I fell violently as the result of a tremendous push. You had the strength of a mad man."

"Dr. Ray says the equipment was badly disrupted. That being the case, can you explain how I got back?" I asked.

"I can remember that much. Your intelligence was not firmly bound into her body in the same sense that it would have been had you been born in it. When the body died, you were released. Since your own body still lived, your mind probably made the return trip with the speed of light."

Newton's face fell as he continued.

"But that is the end of the experimentation. There will be no more transfers. The particular inspiration for the conception and interpretation of these formulas, you once told me I had, is gone, and I do not understand them. In some strange way, I seem to know that I shall never recover that inspiration."

"See if you can remember this one feature about it," I said, somewhat nervously. "Am I, now, carrying 5% queen in my brain?"

I THOUGHT surely that he was going to relapse, he looked so distressed, and I was sorry that I had said anything. The struggle within him must have lasted a minute.

"I am sure I do not know," he said. "You will have to determine that for yourself, if you can. Let's go home and forget it."

Not until then did we realize that we had an audience, so intent had we been on our discussion. Unfortunately for us, Dr. Ray had heard every

word and understood very little. He insisted upon an explanation, and we refused to give it. He kept us three days before he would release us with a clean bill of health, and he only released us then, after I had given him my reluctant promise to send him a written account of the whole story.

My reunion with my family was joyous in the extreme. They had practically given me up as a hopeless case, even though they knew they had placed me in the care of the most competent physician in the country for what they thought was a mental disorder.

I found that my colony of bees had become so ferocious that my father had moved them to the farthest corner of the farm a mile from the house. I visited them, wearing a veil, as soon as I could with decency excuse myself from my rejoicing family.

I sat down by the side of the hive wherein I had my abode. Bees flew about me in clouds, and I was forced to keep my hands in my pockets. In a measure, I was sad. Sixth sense was gone, and I could not communicate with them. Perhaps, I reflected, if I thought hard enough they might sense it.

"Owos," I thought, with the very utmost concentration, "please do not

do it. I, Masoul, wish you not to. Do not sting me, for I am Masoul returned to humanity. I will take care of you and see that you enter the winter with bounteous stores. I will not use smoke when I visit you. You may even rear a new Masoul in your own city, and we shall work together in harmony. Do you hear me, Owos?"

The reward for my effort was several sharp stings. Several of the bees had penetrated my clothing, and, with barbless stingers, were dealing me misery. I was forced to slap at them until I had killed them. I left the swarm then, knowing that I could never again communicate with them, and that, as a human, my work was cut out for me. The colony died that day as the result of poisoning with carbon bisulphide gas. I burned all that remained when the asphyxiation was complete.

This is my story as written for Dr. Ray. Since he is to read it, I may as well give it to the world. While you are reading it I shall be getting together my beekeeping equipment.

They tell me that times are getting better and that I could probably find employment if I tried. In fact, Newton Ware has found a very good position for himself. As for myself—well, I am just not interested. I am a beekeeper for life.

THE END



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FIT GEM AND EVER-READY RAZORS

Six Who Were Masked

By HENRY J. KOSTKOS

An interesting story, a study of the relations of hypnosis and a picturesque presentation of mental action and psychosis. The denouement of it all is well concealed to be revealed only in the last few lines of the text.

ONE by one the six masked men filed solemnly into the white tiled operating pavilion of the Rockwell Hospital. The man who entered first was a gaunt one, grey around the temples. He moved with a studied precision. Next in line followed a fat-jowled man with a pot belly, who laughed nervously as he glanced at the six white-sheeted operating tables arranged in a semi-circle. Then there were four others—but with these we are not concerned.

At the precise centre of the semi-circle of tables stood Dr. Paul DuPrey, his instruments ready, a cold, calculating glint in his eyes. He was adjusting a complicated apparatus of pumps, motors, dials and tubes.

The six approached. The fat-jowled man made a queer noise in his throat, a dry, rasping sound of a man who is afraid of something that is bound to happen in spite of his fears. The others stood beside their tables, not venturing to look up at the rows of faces in the gallery.

Dr. DuPrey peered at the six men in turn, peered behind the black mask of each man as if searching for some sign of weakness, then turned to the gallery of city officials, police officers, scientists and physicians.

"Gentlemen," his voice carried assurance, self-confidence, and a trace of triumph, "you have come here to

witness a most remarkable demonstration, a demonstration the like of which has never been attempted before."

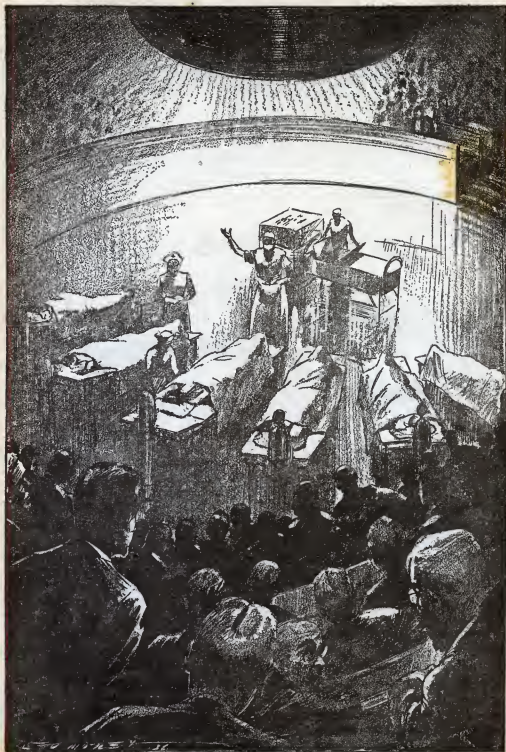
He paused to signal to the squad of nurses and to his two assistants to prepare the patients. Then he held aloft a test tube filled with a red liquid.

"This, gentlemen, is blood," he announced.

The faces of the six blanched beneath their masks; the gaunt one's bony knees were none too steady.

DuPrey continued: "And as you know, blood is the essence of life. But what you do not know, is that the quality of the blood controls the unconscious mind, prompts us to do those things good or evil, that motivate our innermost actions and reactions. Into this blood our glands send their chemical messengers, the hormones, that exert a tremendous influence upon us.

"For long our methods of administering justice have been challenged as being inefficient, inhuman and a futile waste of the most precious of God's gifts—the life of man. An eye for an eye, a tooth for a tooth, was well enough for the dark ages, but gentlemen, we are living in a scientifically advanced period when justice should not be administered in the spirit of revenge. It has long been the dream of humanitarians and scien-



DuPrey paused a moment, returning the baleful glare of the Police Executive without malice, then continued: "Now we will begin the operation."

tists and even of the man on the streets, that some day crime may be cured as are many of the other vicious diseases that plague mankind.

"Here are six men. Five of them have been chosen for their sterling characters; these five are men of unquestionable integrity; they have the most gentle dispositions. One of them, I might say, is a minister of the gospel, a man noted for his exemplary conduct in the guidance of his flock. The sixth," here he looked significantly at the mayor of the city and the police commissioner, "is the man who brutally and inhumanly murdered the beautiful Mary Renault!"

From the gallery, the sharp inhalation of breaths sounded like a cradle swishing through a field of ripened wheat, followed by the buzzing of excited voices. These people had been invited to witness a mysterious demonstration by the world famous scientist, Dr. Paul DuPrey, and they had come because they sensed the importance of the experiment. Now all heads turned swiftly toward the six who were masked.

The gaunt one suddenly became too weak to stand; he sagged across the operating table. The fat-jowled man made that queer rasping noise again, then parted his mouth in a wide, yellow-toothed snarl of fear. The other four, every man of them, tightly gripped the edge of his table and dared not venture a glance at one another nor at the sea of faces gazing penetratingly at them.

Every man in the room knew with what horror the entire civilized world had received the news of the murder of Mary Renault. Here was a girl, young with the beauty of unspoiled youth, murdered, then mutilated beyond recognition. And everyone knew that prior to the finding of poor Mary

Renault's mangled body, four other young girls had met a similar fate within six months.

THE tide of public indignation ran high over the laxity of the police department in apprehending the perpetrator of the shocking murder-mutilation crimes. This had hurt the chances of the police commissioner who had been slated by his party to run against the present incumbent for the mayoralty. But the mayor did not dare to oust his police executive because he himself was being investigated by the potent Civic Improvement Committee.

The mayor and the police commissioner, bitter political enemies as they were, leaped to their feet as one man.

Pandemonium broke loose; unrestrained curses and cries to "lynch the monster" drowned out the efforts of DuPrey to calm the infuriated crowd.

Here were scientists, physicians, city officials—the type of men who should have been the last to have been swayed by mob-psychology, shouting for blood. Those in the front row leaped to the floor of the operating room.

The six looked fearfully at the sea of enraged faces, slid from the operating tables as if of one accord, and rushed for the door. But it was securely locked. Dr. DuPrey had anticipated this very thing and he had given orders that under no circumstances should any one be permitted to leave the room until he was ready for them to do so.

"Gentlemen, gentlemen!" he shouted above the Babel of voices and the desperate panting and screaming of the six trapped men who battered themselves vainly against the unyielding door. "Listen to me! List-

en . . . " but his shouts were drowned out by the heedless mob.

With a grim set of his lips, and brows furrowed in anger, he leaped to a switch, and a purple light flashed ominously in response from the ceiling in the centre of the operating room. The nurses and internes saw the warning signal and instantly slipped breathing respirators over their faces, just in time to avoid the deadly spray that squirted from a hundred nozzles around the walls.

Dr. DuPrey had released a powerful anæsthetic!

Those struck by the spray stopped in their tracks, reeled crazily for a moment, and with a low moan, sank to the floor. Then the fumes spread to the nostrils of the others, and they too dropped unconscious after one breath.

When the last one, including the six masked men, lay helpless on the floor in grotesque positions, DuPrey motioned to his assistants who quickly lifted the prostrated bodies of the six to the operating tables and piled the others back into their seats.

"Here, tie that blood-thirsty crowd to the chairs with these ligatures," he commanded, "we don't want another display of unleashed primitive instinct. That is just the thing I am trying to prevent through this operation."

"But doctor," one of the internes objected, "there is the mayor and the police commissioner, not to say anything about the other influential visitors—how will they take it when they come out of the anæsthetic?"

DuPrey snorted in disgust as he turned on the ventilating fans: "They'll take it and like it. If they don't I'll give them something mighty unpleasant the next time."

Whether or not the doctor would have carried out his threat the others

had no way of knowing, for further drastic measures were not necessary. The group in the gallery was revived by the fresh air forced through the operating room, and even though they found themselves securely tied to their chairs, they offered no remonstrance but looked sheepishly at the doctor and his assistants. The mayor's mouth even twisted into the semblance of a smile as he mumbled an apology for his hasty action.

Dr. DuPrey faced the group, and as if nothing unpleasant had happened, he resumed his explanation where he had been interrupted.

The six masked men lay motionless in their straps on the operating tables. For once the gaunt one and the fat-jowled one were strangely silent.

"I'm going to be brief. As I stated before, one of these six is a murderer, not through choice, but because of a brain disease that motivated him. Gentlemen, he is actually a very sick man. We must recognize the close kinship between physical and mental ailments, or psychoses, as psychiatrists call them.

"This man came to me of his own will, and because he is far above the average in intelligence, he confided in me and told me his whole gruesome story. He knew that I was conducting research work on the problem of curing this type of illness, and I agreed to subject him to an operation, with the understanding that in the event it proved unsuccessful he would be turned over to the authorities to stand trial under our present ineffectual laws."

The police commissioner's heavy voice broke in: "That all sounds well enough, doctor, but how in the name of the devil can you actually determine if you have cured him of this

sickness? Now our way might not be so fancy—but," his tone became grim, "the cure is permanent."

FOR the first time since they had come out of the anæsthetic the fat-jowled man and the gaunt one twisted their bodies in panic within the limits of their straps.

Dr. DuPrey shot a quick glance at the two, then turned his eyes toward the police executive.

"When the man arises from his table after the operation, he will not leave my sight for two years. I will be responsible for his every move, and I will make sure that if there is the slightest reversion to criminal tendencies on his part, he will be confined immediately in one of your delightful institutions, my dear Commissioner."

DuPrey paused a moment, returning the baleful glare of the police executive without malice, then continued:

"Now we will begin the operation. The blood of the five will be mixed with the blood of the sixth in this glass chamber under my hand. As the transfusions begin, this other apparatus will stimulate the pituitary glands by transmitting to them a series of electric waves of the proper frequency. This action, I might explain, is no ordinary thing. In it lies the entire secret of the process. You see, by sending the correct wave length and frequency into the systems of these men, a heretofore undiscovered hormone that controls the actions of the unconscious mind, will be released in copious quantities. I have named it the Subservient Hormone. As you know, blood carries all hormones; then by properly diluting the blood of the man who is a dangerous psychopathic case with the blood of the

five who are models of integrity and moral staunchness, the beneficial hormones will be carried into his body.

"Of course I have made every test to insure that all these men are compatible, as otherwise a blood transfusion would result fatally."

Then, turning to his assistants, he commanded: "All right, insert the tubes."

The internes picked up the rubber tubes terminating in sharp, hollow needles, and quickly inserted one in the vein of the right forearm and another into the artery of the left arm of each man. The tubes led to the mixing chamber manipulated by Dr. DuPrey.

As the red fluid rose in the glass indicator, the doctor snapped a series of switches. There was a faint droning sound, like a thousand busy bees, as the high frequency current surged into the temples of the six men.

Oblivious to everything else, the doctor intently watched his gauges and indicators, adjusted the controls to speed up or slow down the rate of the blood flow, increased the activity of the ray until the glands were discharging the Subservient Hormones at the proper rate. One moment's lack of vigilance on his part might instantly result in the termination of six lives.

On the outside of the circle of operating tables the nurses and internes hovered over the six masked men like a flock of guardian angels.

The operation was soon over. The tubes were removed, and slowly, one by one, each of the six men stretched out his arms, gingerly extended his legs toward the floor and rose from his operating table. Now the fat-jowled man no longer laughed nervously, nor did the thin shanks of the gaunt one shake as if with ague.

Then, one by one as they had entered, the six who were masked left the operating room.

FOR a full three months the city was singularly free from all crimes of violence, as if Dr. DuPrey's operation had had a sterilizing effect not only on the man who had murdered Mary Renault and the four other young women, but also upon all who might have been inclined, tempted, or provoked into doing deeds of violence.

Yet the public had not forgotten that the Police Commissioner had apparently given up all attempts to track down the murderer. And the elections were only a month off. It required all the persuasiveness of his party's leaders to compel him to continue his campaign against the Mayor. There was only one trump card remaining in the Commissioner's hand. He played it.

Next morning when the public read in screaming headlines that the murderer of the young women was actually known by Mayor Downer, that he had not been arrested because the Mayor had decreed that the man should not be molested, that Downer had been present at a horrible operation-orgy performed on the criminal by a fanatical doctor, there was no stemming the public indignation. The Civic Improvement Committee demanded the immediate resignation of the Mayor and the arrest of the murderer.

But the Mayor was not to be caught so easily. In a signed statement to the press he admitted that while he had been present at an experiment intended to cure criminals of their vicious tendencies, he had ordered the Police Commissioner to arrest the man, yet he had done nothing.

These cross-statements only served to throw the public into a haze of confusion, which effectively neutralized the efforts of the political rivals to discredit one another.

During this period the mysterious person who had been living in Dr. DuPrey's grey stone laboratory showed not the slightest tendency toward reversion. The doctor had tested him repeatedly when the man was unaware that he was being watched. He even went so far as to leave him alone in the company of Constance DuPrey, his beautiful daughter, but not by the slightest movement or facial expression did the man betray any abnormality. In fact, the horrible incidents of the past seemed to have been completely erased from his memory at the time his body had been purged of its vicious hormones.

Then out of a clear sky came a bolt that upset the equilibrium of every one connected with the case. In the middle of the night the telephone in Dr. DuPrey's room rang insistently. The excited voice that rattled the diaphragm of the receiver was that of the Police Commissioner.

"Where is the man who murdered Mary Renault?" he demanded.

"In my laboratory, asleep," Dr. DuPrey replied, rubbing the sleep from his eyes.

The Commissioner's tones rasped unpleasantly: "Are you sure of that, doctor, or only surmising?"

"Why, I have every reason to believe he is there, as he has been day and night since he placed himself under my care," DuPrey replied, his voice tinged with alarm.

"Well, doctor, he is not there tonight. We just picked him up. Back to his old tricks; we caught him near the mangled body of a young girl.

Where do you suppose? In the vestibule of the First Avenue Church!"

Dr. DuPrey gasped, then sank back weakly on his bed.

"I . . . I can't believe that to be possible, Commissioner." Then resolutely pushing himself up to an erect position, he shouted a denial: "No! I won't believe it! It could not be. Are you at headquarters? . . . I'll be right over!"

With a bound he leaped to the floor, pulled on his clothes, summoned his chauffeur and within a few minutes was on his way downtown as fast as his car could speed. He stopped *en route* at his laboratory, then proceeded to Police Headquarters.

AS he rushed into the Commissioner's office he drew back with a start. There, sitting in a chair, handcuffed and surrounded by uniformed policemen and detectives, was the gaunt one, now snow-white around the temples, who had headed the file of the six masked men into the operating pavilion of the hospital three months ago!

The man's face, which at that time had been calm and gentle, was now unrecognizable. He was ghastly pale; cold sweat had broken out upon his forehead; his thin legs trembled violently. The man's hard breathing bespoke a laboring heart; his eyes were bloodshot with fear. Beyond doubt, he was in an intensive emotional panic.

The accused man kept muttering in a dry voice over and over again:

"I didn't do it—I didn't do it—My God! I tell you I didn't . . ."

The commissioner caught sight of Dr. DuPrey.

"Here is the man you 'cured'," he grunted sourly.

DuPrey hurried over to the gaunt one to push back his shoulders and

peer into his ghastly face as if he could not believe the evidence of his own eyes.

"But Commissioner," he turned to the police executive with a bewildered expression, "this is not the man who murdered Mary Renault. This is one of the gentlemen who donated his blood and hormone—the Reverend William Hollis of the First Avenue Church!"

Then, suddenly realizing the possible significance of the transfusion, the doctor clamped his hands to his eyes and slumped into a chair like a stricken man. A thousand conflicting thoughts flashed across his mind and seared his brain tissues like a cauterant. Could he believe the evidence that was revealed before him? Impossible! He had tested the effect of the hormones conclusively on his laboratory animals before he had dared make the experiment on a human being.

But how could he explain what Reverend William Hollis had done? Doubts began to assail him. He felt tired, sick, burnt out . . . his life work . . . Bitterly he whispered to his own consciousness: "What have I done? In curing one murderer, I have planted the seeds of the devilish disease into the minds and bodies of five others . . . My God, have mercy . . ."

Slowly he raised his head and looked with glazed eyes at the policeman.

"Perhaps . . . you had better put the others under close observation at once . . . Here are their names . . ."

The commissioner snatched the sheet of note paper from the doctor's hands and barked:

"Now, how about this other murderer whom you have been keeping in

your laboratory. Where is he now? Produce him!"

"His name is Rischell," DuPrey said slowly, then with a challenging note in his voice he cried: "He is innocent of this crime! He was still at my laboratory, sound asleep but I brought him along. He is out in the hall now with my chauffeur."

"All right, Lieutenant," the Commissioner snapped harshly to the officer alongside of him, "bring him in and put him under arrest. This business has gone far enough."

And so they brought in the fat-jowled man with the pot belly. No longer did he swallow nervously but was self-possessed and calm, this man who had been converted into a harmless and safe member of society at the possible expense of five others into whom he had transmitted his vicious hormones.

THE Mayor seized avidly upon this opportunity to vindicate his integrity. He issued statements to the press calling for an early trial and conviction of the murderer. When, a few days later he announced the confession of Reverend Mr. Hollis, the Mayor felt sure that his constituents would give him full credit for staunchly upholding the laws. Yet the Police Commissioner was equally resolved to capitalize upon this latest episode by doggedly advocating swift punishment for both Rischell and Rev. Hollis.

In the days before the two, the gaunt man with snow white hair and the fat-jowled one, were to be tried for murder, Dr. DuPrey locked himself in his laboratory, away from inquisitive eyes. As though it weren't enough to have failed in an experiment that was to have freed the world of the law of retribution, now he him-

self was threatened with indictment by the Police Commissioner for shielding and abetting a murderer and causing the delinquency of the Reverend William Hollis.

The case, needless to say, created a turmoil in jurisprudence throughout the world, and was on the lips of every man, woman and child. Fortunately, the other four who had donated their blood and hormones showed no signs of having been adversely affected, but nevertheless they were kept under constant surveillance by the police.

The Commissioner wasn't going to let this opportunity of becoming prominent in the public eye slip by him!

When the case came up for trial, the crowds fought to get into the court, until the police reserves had to be called out to maintain order. The Commissioner was resolved to set the stage in keeping with the drama that was to be enacted thereon.

True to DuPrey's expectations, he was arrested an hour before the court opened, and along with Rischell and Reverend Hollis, he was charged with murder.

THE District Attorney felt he had an airtight case. His star witness, the Commissioner of Police, expanded his chest until the gold braid on his dress uniform was as taut as fiddle-strings. He related how he and others had been summoned to witness a demonstration of a mysterious nature by the great Dr. Paul DuPrey, how they had remonstrated against giving a murderer an opportunity to avoid paying the penalty for his vicious crimes, how they had been cruelly anesthetized—here the Commissioner turned to the Judge with an injured air, and addressed that worthy di-

rect: A criminal offense in itself, your Honor," and as the Judge nodded sympathetically, the Commissioner recounted his connection with the entire case, even though much of it was irrelevant and aside from permissible testimony.

Strangely enough, the Counsel for the defense offered no objections, and devoted his entire attention to a tall, distinguished looking man wearing a neatly trimmed Vandyke beard.

The fat-jowled defendant sat imperturbably listening to the testimony that would probably send him to the chair. The gaunt one was a pitiful looking object, his stiff clerical collar wilted from the cold perspiration that streaked down his neck. And Dr. DuPrey, aged many years, listened with incredulity written on his face. He had, even up to now, refused to believe that the experiment to which he had devoted so many years of painstaking research and which he had checked and rechecked countless times, had actually failed.

To the astonishment of the Court and the growing uneasiness of the Police Commissioner, the counsel for the defense waived his prerogative of cross examining the State's witnesses. Even after the three defendants had been examined by the prosecution, the counsel sat implacable, engrossed in a low-toned conversation with the Vandyke-bearded man. Thinking the case won without a struggle, yet puzzled by the strange behavior of the defense, the District Attorney addressed the jury. When the ringing eloquence of his words had died away, a hush of expectancy filled the court room.

The counsel for the defense had risen. Now he bowed to the judge.

"Your honor, I would like to present a witness. He is Dr. James Row-

land Vouclain, the eminent psychiatrist, physician and Doctor of Philosophy, who is perhaps the world's greatest authority on the functions of the unconscious mind, and whose works on the various psychoses have a high standing for authenticity in the courts of law throughout the world. Will you please take the stand, Dr. Vouclain?"

All the eyes followed the doctor as he walked confidently to the witness chair and raised his right hand to take the oath.

"Now, Dr. Vouclain," the counsel began, "if you will try to couch your answers in terminology that even we laymen can understand, it will be appreciated. First, have you known any of these three defendants before?"

In a well modulated voice, the psychiatrist answered: "I have met Dr. DuPrey professionally; the other two were strangers to me."

"You said 'were strangers'. Does that imply that you have since made their acquaintance? If so, how long have you known them?"

"I met Mr. Rischell a little more than three months ago. Dr. DuPrey's experiment interested me and I asked permission to examine his patient thoroughly before and after the operation."

"Ah, and what did you find?"

"Before receiving the hormone transfusion, Mr Rischell was suffering from a dangerous obsession that held his mind powerless in its grip and which impelled him to commit some shocking murders. After the operation I tested him a number of times and can report positively that he had been entirely cured of his psychosis and is now a normal man."

"Dr. Vouclain, when did you first meet the Reverend William Hollis?"

"Two weeks after the hormone transfusion."

"Did Dr. DuPrey ask you to visit the Reverend?"

"No, Mr. Hollis sent me a wire urging me to come at once before he lost his reason and committed some horrible deed that he could hardly refrain from doing. Needless to say, I was thoroughly alarmed and hastened to see him."

"Then you examined the Reverend at that time, I take it? What did you find?"

"After subjecting him to a most searching examination that required a week to complete, I could discover no physical illness nor even the slightest tendency toward the mildest form of a psychosis. But," Dr. Vouclain rose in his chair to better emphasize his words, "although the unconscious mind of Reverend Hollis was normal, yet it was absolutely beyond his control!"

"That sounds paradoxical, doctor," the counsel objected. "How could that be possible?"

"Through mesmerism, by someone who wanted above all other things to make the Reverend Clergyman admit that he had committed the hideous crime that he is now charged with!"

Necks craned forward as the people in the court waited expectantly for the psychiatrist to explain his startling revelation.

"When I first undertook the case, I was afraid that in some manner the Reverend gentleman had indeed been affected by the interchange of hormones, but subsequent facts fortunately proved that this was not the case. I want to state that to this day Reverend Hollis can not realize that he was influenced by any one—a

perfectly natural line of reasoning, as you will see.

"By painstaking questioning I was able to catalog every individual with whom he had come into contact, and to record as far as possible the words of the conversations as well as the Reverend could remember them. Here I made a discovery. Almost daily, a certain member of his congregation either met him or spoke with him over the telephone about various things, mainly relating to church affairs. This man, I might say at this time, is well known. He holds an influential position in this city and is president of a men's Bible Class. Most of the conversation was irrelevant, it had no bearing on the case, but there was one thing that interested me:" Dr. Vouclain paused dramatically, and accented every syllable of his words, "he never failed to inquire solicitously about the Reverend's state of mind, and he never failed to allude to the possible fate of the men who had donated their hormones to cure Rischell!"

The Police Commissioner glanced uneasily toward the door.

"Would you say then, that this man was aware of the fact that Reverend Hollis was one of the five who gave his hormones?" the counsel asked.

"Not necessarily. However, I now know that he had actually been present at the demonstration and recognized the Reverend in spite of the mask that hid his features.

"Now, this man knew that if he 'discredited Dr. DuPrey's work by proving that his methods were ineffectual and even downright dangerous he would secure certain political advantages. He therefore tried to provoke, influence, yes, actually to mesmerize Rev. Hollis into admitting the committing of a shocking murder

in order to gain for himself credit for astuteness, which would bring him favorably into the public eye.

"However he overlooked one extremely important thing in his well laid plans: while it is true that Hollis was an excellent hypnotic subject, it has been proven a countless number of times, and is now taken for granted by all psychologists and psychiatrists, that no person, even though he is placed under the strongest hypnotic influence, can be coerced into doing something that is actually against his basic nature.

"Therefore," the psychiatrist brought the palm of his hand down hard on the bench, "I will state under oath, and at the risk of my professional reputation, that the Rev. Hollis, despite his voluntary confession and insistence, did not murder the poor girl found dead in his church!"

The District Attorney leaped to his feet.

"Your Honor, I object. Although the learned witness is a psychiatrist of great repute, still his testimony as to the probable action of the human mind is unsupported and unconvincing. I ask that it be stricken from the records of this case."

The judge nodded his head.

"Objection sustained. The defense must offer undisputable proof that Rev. Hollis had been subjected to hypnotic influence cited by the witness."

Dr. Vouclain smiled. "If I had the slightest doubt that the Reverend was not a safe member of society, I should have been the first one to suggest that he be confined to an institution before he could do any damage. I shall therefore be glad to present proof of his innocence, your Honor. Will the Reverend step up here?"

Every pair of eyes focused them-

selves upon the pitiful gaunt figure that walked slowly up to the bench like a man in a dream.

"Now remove your coat, please."

Dr. Vouclain helped the man out of his black frock-coat. The court gasped. Strapped to the man's chest, directly over his heart, was a wide belt supporting a flat box. Through a glass window in the box could be seen a thin, irregular, red line made by a stylus on a moving strip of paper.

"This is a device of my own invention, called the Recording Neurograph. It charts the emotions, and records the emotional equilibrium of the subconscious mind. It is connected directly to the nervous system of the body by means of an extremely delicate bundle of sensory artificial nerve fibres. Immediately after the hormone transfusion, all six men were equipped with this device by Dr. Duprey as a precautionary measure, after which the boxes were sealed.

"In this box is a record of this man's reactions during the past two months. Let us look at it."

THERE was a surging of spectators to the front. The Judge came from his bench and the jury crowded around to watch Dr. Vouclain as he broke the seal and opened the door of the mysterious box. Carefully he unrolled a long strip of paper and held it up for inspection.

"See, it is dated along the bottom, and is advanced automatically and regularly by means of a chronometer. Now notice, the record begins the day of the hormone transfusion. The curve runs along normally for two weeks after the operation, then gradually climbs up, and up, until it levels off at plus forty on the scale.

"This was strange, for the records of the other four men who had also

been subjected to the transfusion remained at normal.

"See this point? It is three months from the date of the operation. That is the day on which the mutilated body of the girl was found in the Reverend's church, with him near-by. As you can see, there was but little emotional change actually recorded.

"Then following his confession a week later, the curve again dropped down to normal.

"Now, the significant thing about all this is that the curve rose to an abnormal level some time before the murder was committed, and the rise was coincidental with the time that the Reverend was subjected to the hypnotic voice and influence of his parishioner."

"But couldn't any one else have caused the same reaction, Doctor?" the District Attorney asked, "I mean any one who made it a point to repeatedly mention the shocking murders."

Vouclain smiled without amusement.

"Suppose you try it," he suggested, "say anything you wish, to the Reverend."

The District Attorney adopted his best third degree manner, and a voice that was calculated to frighten the wits out of a man of far greater courage than Reverend Mr. Hollis, he questioned him and accused him of committing the most gruesome and shocking crimes. But the stylus of the Neurograph failed to depart from the normal line.

"Are you satisfied?" Vouclain asked. "Now watch!" he commanded mysteriously. "Dr. DuPrey, will you set up the magnetic voice recorder?"

A buzz of excitement ran through the court as the crowds attempted to push toward DuPrey and the black box he was opening.

"All right, Doctor," Vouclain signaled to DuPrey, "turn it on!"

There was a faint hum from the instrument, then from the loud speaker came a voice, strangely familiar, syrupy soothing, with a trace of the occult in it.

"Look!" Vouclain commanded, pointing to the chart.

The stylus of the Neurograph wavered uncertainly, then suddenly jumped high up on the tape, and palpitated there violently.

The court stood aghast at the change that came over the face of Rev. Hollis. His eyes sank back into their sockets, became shrouded with a pale gray mist, his mouth formed soundless words, a cold sweat beaded his brow and his gaunt frame trembled violently like a thin sapling in a sudden squall.

The voice continued: ". . . now, my dear Reverend, the hormones of the wicked have surged into your body. A body that was once pure and holy, but into which the devil has glided sinisterly. Why do you tremble, my dear Reverend, unless you fear that you had become a man who is transformed? Those slim white bodies yearn for the feel of the knife, as the red blood"

A piercing scream rent the ears of the people in the courtroom. With a wild leap the Reverend tried to throw off the spell, then sank moaning into the arms of the attendants who caught him in time to prevent him from swooning to the floor.

Even before the voice ceased, an excited and awed tremor surged through the court room.

Someone cried hysterically: "That's the voice of"

"Grab that gun!" DuPrey shouted. But it was too late.

The loud bark of a revolver deaf-

ened the eardrums of the people. The crowd whirled at a horrible cry of pain, to see Mayor Downer slump to the floor, clutching the smoking weapon in a death grip.

AFTER the courtroom had been cleared the Prosecuting Attorney, the Judge and the Jury crowded around Drs. DuPrey and Vouclain.

"I'm not much of a politician," DuPrey apologized, "but even I can see some sort of half-crazed motive behind this thing. As we all know, the Mayor had been hard put to explain his extravagances and the corruptions in his government. When he was forced to appoint the Commissioner here, much against his will, it cramped his style, as the saying goes. Then it developed that he was to be dropped by his party and the Commissioner was to be nominated in his place for the mayoralty.

"We discovered subsequently that the Mayor had been noted, many years before he became prominent in politics, for his performance as a hypnotist with a travelling medicine

show. Yes, I understand that he became quite expert at it. He went under a pseudonym and darkened his face and wore the robes of a Hindoo prince.

"At first I didn't know whether he was actually responsible for the murder of the girl in the church or whether he merely seized upon the incident. But in digging back into his past, I unearthed a certain Dora Mignet, a dancer, whom the mayor had known intimately when he was on the road, and who had probably come back to blackmail him. Here was his chance to literally and figuratively kill two birds with one stone. And when he lost his head and acted as his own executioner, he conclusively proved his guilt."

As Dr. Vouclain turned to leave the District Attorney called to him: "Wait, doctor! How in the world did you manage to inveigle him into letting you record his voice?"

It was Dr. DuPrey who answered.

"We didn't. That was the voice of a clever impersonator that you heard. But it was effective."

THE END



The Human Pets of Mars

By LESLIE F. STONE

One of the nicest features of this story is that its much admired authoress has brought in an excellent picture of human nature with the characteristics of man and woman in an absolutely bewildering environment. The combination of human nature with the strange Martian beings is most amusingly put before us.

CHAPTER I

MISTS had hung above Washington all the morning, then with their clearing at noon the city grew aware of the strange machine hovering a few thousand feet in the air, above the Washington Monument. Never had there been seen a stranger ship. Golden in color, it looked like a huge round cheese-box, or a drum, only monstrous in size, a good thousand feet in diameter.

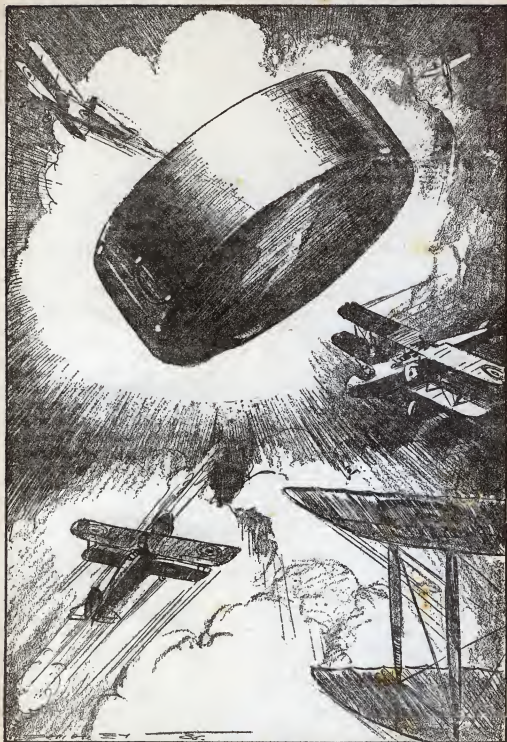
The President, from the verandah of the White House, saw it. People crowded to office windows, and into the streets. As far as Chevy Chase they saw it, and housewives came into the streets to stare in wonder and in fear. Then, as it was seen that the thing was about to land, was drifting to the municipal golf-links on Haines Point in Lower Potomac Park, wild excitement reigned. Some motorists thought to escape from the city, heading northward, or crossed the river to the Virginia shore; but most of them followed the Drum-Ship, pushing in upon the Point, driving the hurriedly augmented police-force half crazy.

Orders were dispatched from the White House. The Police Commissioner was directed to deploy his corps upon the golf-links; every fort

near the city was warned to stand in readiness for action; planes were ordered out from Boeling Field and the Naval Hangars. No one had any idea from where the golden ship had come. Was it in peace or in war? Did it come from the other side of the world?

Now it was descending, dropping lightly upon the links. A circular opening in its side gave a glimpse of its shining interior, golden as its exterior. People shrieked and screamed, however, as the Things from within emerged into the sunlight. Those who had been crowding the police forward fought to retreat, restrained only by those behind, who also fought and screamed to get away . . .

At first no one was certain of his impression, but already an intrepid radio announcer with his portable microphone was describing the horrors as they emerged from their ship. Six of them, forty-feet tall. Octopods he called them at first, but a second glance showed them as having ten tentacles instead of eight, surmounted by a flabby sack-like body topped by a round soft head from which projected the tentacles, possessing a round rubbery toothless mouth and three lidless staring eyes. Five of the tentacles had large, padded foot-like extremities, while the remaining five,



Planes circled overhead, also firing upon the drum-ship, but with no apparent effect. The shells simply bounced back.

which were held furled around the hairless bodies, like rosettes, ended in small ten fingered hands, having two thumbs.

In color the creatures appeared a dull black over which lay a golden sheen that caught and reflected the light, and unlike true octopods the tentacles possessed no sucker cups, but were smooth. Decapods was a better name for them, and the announcer revised his first description by substituting that name.

After climbing from their ship, these awful visitants stood staring at the frightened mob, their lidless eyes flickering in this direction and that, but they made no hostile move toward the populace. From them could be heard high piping sounds, like the chirping of birds. Then, they discovered the Washington Channel that lay dimpling in the sun between the Point and the city-wharves.

In one accord all six beasts moved toward the water, the people crowding out of their path. General Tasse, director of police, ordered a cordon of his men to block their way, but they proved no obstacle, as the monsters simply stepped over their ranks, carefully, so as not to tread upon them, and made their way to the water.

One of their number was seen to dip an unfurled "arm" into the water, then with a loud plop lowered itself into the Channel, the others following. There, like happy school-boys, they disported themselves, their gargantuan play causing high waves that went careening against either shore, rocking the yachts anchored there, swamping some of the smaller boats. Then, they were climbing ashore at the wharfs to make a peaceable tour of the city, doing no more damage than the pilfering of a few fruit carts

along the Avenue, and scaring motorists out of their wits.

In a quandary Washington gave them the right of way, while scientists from the Smithsonian hurried to the city proper, hoping to communicate with them, to learn whence they had come, to study their science; but the monsters, who spoke among themselves in their high fluty tones, gave the scientists no time to catch up with them, simply stepping over each new obstacle put in their way. Capturing them, for the moment, seemed out of the question, and since they appeared completely unarmed, and apparently inoffensive as far as their intentions were an indication, nothing was done for the nonce, except that the police sought to untangle the traffic jams they caused everywhere.

General Tasse, abiding by orders, had tried to give them a motor-cycle escort, to clear the way ahead, but the beasts had disregarded this honor, as they seemed to disregard everything else of their startled hosts, deserting the escort whenever something in another street attracted their attention, leaving the police officers to catch up with them as best they could.

For several hours this continued, and in that time engineers from the Bureau of Standards attempted to make something of the unprotected ship, having hurried to the Point in auto-gyros. Only, as the decapods themselves defied the attention of the scientists, so had their ship's motors defied the engineers. Never had they seen such machines, no two alike, resembling nothing of Earth.

For instance, one machine was found to be six-sided, and each part simply a multiple of pentagons. Another had eight sides, a third was a series of three-sided figures, every-

thing within coinciding with that shape. In color they were golden, like the ship itself, and transparent. On entering the drum-ship, the engineers had been startled to discover that whereas they could not see within the ship from without, from inside, they could see everything beyond perfectly clearly. Altogether, the ship was alluringly obscure.

The march of the decapods lasted for about three hours, although, actually, they did not get very far—merely wandering through the business district of the city and some of its monumental Government Buildings—owing to the fact that they went, for the most part, in circles. Now, they seemed restless, anxious to return to their ship, and in a body they headed for the Washington Monument, like a finger pointing to the sky. Reaching its foot, one of their number proceeded to climb the obelisk—on the OUTSIDE.

A few minutes later it descended once again, joining its fellows. It had taken bearings, found the drum-ship, and under its leadership, the five others started back for the municipal links, crossing the railroad embankment to do so.

Possibly, the capture of life specimens of this world came only as a second thought to the decapods when, suddenly, a child excitedly dashed in front of them to reach its mother beyond them. A prolonged shriek went up from the crowd of onlookers who had milled over the golf links all these hours. For the child never reached its mother. Instead, it found itself lifted high in the air, in the hand of the foremost of the decapods!

With only a thought to save the child Officer McCarthy spurred his horse, Prince, forward. And the next instant, he, too, like the child was

raised aloft with his horse. He may have saved himself, but his first reaction was to cling to his kicking horse, and when he had straightened in his saddle, he found himself too high in the air to dare to jump. . . .

CHAPTER II

THE Bureau of Standard engineers were still delving into the unguessable secrets of the drum-ship when it was discovered that the monsters were returning. Pell-mell they ran out, piling helter-skelter into their auto-gyros. That is all but Brett Rand and his chum, George Worth. Never in his twenty-seven years had Brett come upon a machine whose essentials he could not grasp in an hour's time. It was said of him that he had teethered upon a stillson wrench, and it was true that when other kids were taking toys apart, he was putting small motors together, and making them "go." Where his fellows were ready to give up, he was only beginning to tinker.

Had there been a wire or cable, he might have traced it to its source, but there was nothing among those multi-sided machines of transparent golden metal that he could actually put his finger on as familiar. Somehow, he had removed the top of a peculiarly flat machine, and with an experienced screw-driver was feeling around the strange array of parts, although, to tell the truth, there were no screws to tempt his implement."

It was only by super-human effort that George managed to pull him away from the machine, to drive into his one-track mind that the decapods at that moment, were returning to the ship. Brett had not liked being disturbed, in fact, a sharp elbow caught George under the chin, sent him

a-sprawl. But he came back and managed to draw Brett toward the doorway. Only it was too late.

The decapods were upon them; one already about to enter the ship. And not empty-handed either. In one arm was a wildly kicking horse, in whose tilted saddle a police-officer clung, in another a small girl of about six, who, in turn, clasped a mewling kitten to her breast. An ashen-faced negro was caught in a third coiled arm, while in the fourth, a belligerent, red-faced matron dressed in neat serge and wearing a stiff sailor hat, pummeled the monster with a tightly rolled umbrella. Other beasts following the first were also loaded down with captives, men, women, youths; white and black, without discrimination. There was even a wire-haired terrier among the captives.

At bay, the two young men scarcely knew what to do. Behind them lay the motor room, a large circular chamber in the center of the ship, reached by a corridor. And from that opened a half a dozen wedge-shaped rooms, shaped so, to conform to the contour of the ship. Retreating before the oncoming monsters with their captives, they reached the central room first, then dashed into one of the smaller chambers, bare, but for a number of metallic straps hanging here and there from the ceiling, with a wide circular mat upon the floor.

Outside, they could hear the rat-tat of gun-fire; the police and soldiers attempting to rescue the prisoners, shooting low at the feet of the decapods, shots that simply *ricocheted from their flesh without the least damage*. Planes circled overhead, also firing upon the drum-ship, but with no apparent effect. The shells *simply bounced back!*

Through the wall of their retreat

Brett and George saw the monsters deposit their prisoners in a second chamber, then close the door upon them, and turn to their machines. There was some tootings when the top was found off the machine Brett had tinkered with, and looking up one of the beasts discovered the culprits. The next instant it was coming toward them.

Brett still retained his screw-driver. Certainly he did not consider it much of a defensive weapon, his was more the natural reaction of a treed man as he let it fly toward the decapods. However, the missiles never reached the eye for which Brett had unconsciously aimed, as a small hand caught it mid-air, the beast scarcely changing its stride as it came on.

"LOOK OUT," cried George, "it's going to gas us. Cover your face"

But there was no protection from the orange vapor that suddenly issued from the creature's small mouth. It filled the room, and the pair found themselves drifting away

What followed had been a page out of a nightmare. Brett, sinking into the artificial coma induced by the orange gas, was aware of a terrific detonation, then a horrible sinking sensation that gripped his stomach—and oblivion.

HE woke to a semi-consciousness aware of a splitting headache and an awful nausea. There was darkness around him, a deep black velvety darkness, in which great sparkling stars shone in the middle distances. He was aware of a groaning and moaning all around him, but was unable to orient himself, going into one intermittent doze after another. That he was fed during the hours that followed, he could remember, although

the thought of food made his stomach turn over. However, unable to avoid the ministrations of a nurse bending over him with a large scoop-like spoon, he had been forced to partake, the first mouthful, oddly enough, easing his sickness. The undefinable stuff had been both food and drink, quenching thirst and settling the stomach.

Then, after an indeterminable period, had come the cessation of the motor's throbbing present through his dreams, and with his fellow captives he was borne from the ship, mind clear once more, into a strange towering building wherein monsters, the same as those who had captured him, examined him, probed and pinched. Long afterwards he could still hear the screams of the three who had died under the knife, their living flesh having been dissected by their inhuman captors.

From there they had been carried into an immense hall where took place an assembling of thousands of decapods. The chamber held a wide dais, ten feet high, and before it the captives were awaiting the next event.

Finding himself still whole, Brett raised himself upon his elbow to look around. The chamber was perhaps a thousand yards in diameter, oval in shape, with two great doorways at either end, through which the black decapods were pouring. He shuddered anew at the sight of them, then turned his eyes to his fellows, who were likewise beginning to take cognizance of their surroundings.

He recognized the severely dressed matron whom he had seen the day of their capture, still wearing her stiff hat, and holding her umbrella in one hand. Immediately he dubbed her the Militant Matron, the term fitted so well. Near her, feet sprawled

out before him, squatted a middle-aged man in a neat business-suit, florid of face, who even in these circumstances could retain his pomposity. "The Senator" seemed the title best to fit him. A colored woman lay supine on the floor not far away, moaning and sighing as she mumbled something about the "Lawd's judgement," and beside her sat a tooth-chattering blue-jeaned negro.

There were more, a pale faced man of indeterminate age, nondescript of coloring, who may have been a haberdasher's clerk,—a small young matronish-looking woman with a face filled with terror,—a tall, lean, dehydrated spinster,—a not too neatly dressed young man with inquisitive eyes that darted here and there, taking everything in. Then, there was the small girl with her kitten, still held tightly in her arms, who stared around with wide-open eyes, and a little boy a few years her senior lying on the floor, sobbing his heart out, while not far away crouched a seventeen year old girl, with ultra-high heels, a rumpled though modish silk dress, and a tiny crush hat, clasping an oversize purse against her chest.

There were others, but Brett's survey suddenly came to an end, for on turning around he found himself staring into the coolest pair of the bluest eyes he had ever seen. She would never have won a beauty contest, her features were too irregular, her mouth too generously wide, yet she possessed that inner something, which so often lifts the ordinary-appearing woman out of mediocrity. Fair-skinned, with a mop of chestnut hair framing an oval face, her main features were the bright intelligent blue eyes with their steady gaze.

"We—we seem to have arrived," she murmured. "Will you pinch me,

please, so I can find out if I'm dreaming or not?"

Brett gave another glance around. "No, I don't think we're dreaming, but those creatures certainly look like they've come out of a nightmare." He jerked his head toward the monsters slowly filling the vast hall in great circles, each squatting on the floor as it found its place among its fellows.

"And I thought it would be a great thing to do a paper on them, for biology class. I'm studying at the George Washington University that is—I was"

"And I—" Brett suddenly realized that, but for his intense interest in those damnable machines, George and he would not be here. Contrition filled his heart, and he looked around for George. George was coming toward him, carrying the little eight year old boy in his arms.

"Will someone please look after this kid? He's crying his eyes out for his mother"

The blue eyed girl took the boy from George's arms. "I wanna go home, I want my muvver," he was muttering.

At that the little girl with the kitten looked up from her pet, and crawled to their side. "It's all right," she told the little boy. "This is just one of my bad dreams. I have lots of 'em, but I always wake up in my own little bed at home!"

And, as if that settled the question, she turned back to her mewling kitten. The boy looked at the speaker and grunted, then closed his eyes without a word. Brett and the girl exchanged glances.

But there was no more room for conversation, the hall had filled up; hundreds and hundreds of decapods squatted in close ranks. Suddenly, as if at a signal they all stood up, turn-

ing their bodies so that they faced one of the two doorways, through which was coming an immense monster, some ten feet taller than the tallest.

"Must be the high Mogul," muttered George, "look, he's got a retinue, too."

The massive creature was progressing down a lane opened for it, surrounded by ten smaller creatures, smaller even than the majority of the decapods. Reaching the dais, the Mogul as George had called him, took his place upon the platform, half reclining, while his ten followers stood at attention in a circle around him. Thereupon, a great sound went up from the throats of his subjects, and every beast unfurled its five arms, raising them on high. Not until the rites that followed were at end, did they drop them again.

UNAWARE of what was to take place the captives drew together, waiting nervously. The negro wench began to pray in a high hysterical voice, a woman sobbed in the gathering, and Brett heard the "Senator" declare: "I'll have them know that they can't do this to a citizen of the United States"

Now six decapods were coming forward until they stood just on the edge of the circle surrounding the dais, beyond the captives. One of their number commenced to speak in its high fluty tones, addressing the giant creature on the dais. For twenty minutes or so it orated, and no sooner had it ceased than a second of the six took its place.

"Looks like an endurance test," whispered Brett to George when half an hour later the third decapod commenced to speak.

"You know, I believe these are the

six monsters that brought us here. They're reporting upon their expedition"

"Yes, but our captors possessed a golden sheen. These are all solid black Why—of course—they were wearing armour, George. That's the reason our bullets didn't hurt them."

"Right—some of that transparent gold of theirs"

"Have you any idea where we are?"

"Only that we're no longer on Earth. Notice how light you feel? As if you've had a few pounds lifted from your shoulders?"

Brett raised an arm. "Why yes, there is a difference here. Notice how much faster we're all breathing? Wherever this world is, George, it's smaller than Earth. And to think I got you into this, when"

"Aw don't start that stuff, kid. It may not be as bad as it seems. There, the last chappie is making his speech. Maybe we'll find out where we stand now"

Looking up Brett saw that the sixth decapod was now making its speech, but he was unprepared for what happened next, as a long tentacle shot into the midst of the captives, grabbing up the little six year old with her kitten! Hands caught him on either side as he started to the defense of the child. It was George and the blue-eyed girl.

"Wait—perhaps they won't hurt her. She's being shown off to the Mogul."

Brett cooled down as he saw the child had come to no harm, but now stood on the dais before the huge squatting monster. Unconcerned, she gave him look for look, but let out a wail when the same hand that had grabbed her up, pulled her pet out of her arms. But it was only to hold the

tabby before the Mogul's eyes, then it was returned to its owner. Thereupon, the child was lifted to the floor once again, and this time it was the policeman, McCarthy, and his horse that were hoisted to the platform.

McCarthy had been standing beside the animal with hand on its muzzle, trying to calm it, for the creature was wild-eyed and all in a tremble. It gave a high squeal as the long arm came down upon it. Unceremoniously McCarthy was lifted to the saddle, regardless of the fact that he was placed there backwards; and it was only by gripping the saddle wildly that he managed to stick on, as he and the kicking horse went through the air.

He swung himself around in the saddle, just as the horse reared on its hind feet, thereby displaying a fine feat of horsemanship as he held his seat. But as soon as he had quieted the horse, the same hand that had put him there plucked him from the saddle. Then, no sooner was he on his feet than he was placed upon the saddle once again. This was repeated a number of times for the edification of the ruler who tittered in his high shrill voice over this phenomenon. Evidently, the decapod could not understand just why the horse and man came apart. A murmuring came from the close packed ranks of the assembly as well.

When the pair were returned to their places on the floor it came the turn of the Militant to be examined. Her face went beet-red and when she stood before the Mogul she told him in no uncertain terms what she thought of her treatment, explaining that whereas she was a D.A.R. and an F.F.V. it behooved the creatures to return her straightwith to her Virginia home.

She might as well have talked to

the wind for all the attention the monsters paid her. One of the negroes was lifted to her side, and by the manner of the lecturer the others saw that the decapod was pointing out the difference of the coloring of the pair to the king.

Following that, each captive in turn was lifted to the platform to be oogled, and then returned to his place. Brett had looked forward with loathing to the touch of the decapod tentacle, but when it came his turn, he found that the arm felt like old well-worn leather, its temperature only slightly below that of his own.

The inspection ended, the Mogul next addressed the assembly and the six intrepid explorers. Then, he seemed to be giving instructions. Six long arms darted among the captives, and six of them were indiscriminately plucked up. Next, the ten creatures of the Mogul's retinue chose those among the group that they desired, lifting them high in their arms. Two more decapods were called forth from the innermost circle surrounding the dais, to pick up the two other captives, and the assembly was at an end.

Dropping off the platform, the Mogul hurried from the chamber followed by a creature bearing McCarthy and his horse aloft, then one by one the others followed with their burdens.

Outdoors Brett discovered they were in a great plaza covered with red sand, in the center of which was an artificial lake fed by a canal coming from a "thicket" of towers that surrounded the plaza on all sides. Overhead was a blood-red sun riding in a copperish sky.

THE towers, for the most part, were uniform in size and height, some fifty feet in diameter, rising

about four hundred feet into the air, and were of the same golden metal that the decapods appeared to use in all their projects. Across the plaza from the large building that had contained the assembly chamber, was a second tower of the same size. These two buildings broke the monotony of the uniformity of the decapod city.

Brett suddenly discovered that the Earth captives were not to be kept together, instead their captors were going off in all directions, some crossing the plaza, some going southward and others northward. To his wonder, he saw the ruler climbing the tower they had just quitted—*on the outside*.

A closer scrutiny showed that the monster was climbing by means of heavy bars affixed to the wall at intervals of ten feet, climbing hand over hand, until he looked like a pin-wheel. And following him came the creature bearing McCarthy and his horse, the pair held in one furled arm while the other four were used to pull the monster up the unique stair-case.

In the side of the building he saw round openings spaced fifty feet apart, and it was into one of these doorways that the captives were borne. His own horse was already moving away from the tower in company with the pair carrying the Militant Matron, and the tall blue-jeaned negro whose name he was to learn as Jeff.

Looking around for George, Brett found he was being taken across the plaza. The blue-eyed girl had already disappeared as had some of the others.

At a tower not far from the Royal Palace wherein McCarthy had disappeared with the Mogul, Brett's captor came to a halt, and he realized they were about to mount it. The decapod took a firmer hold around his waist

and grasping the nearest rung of the ladder started upward. With only those stationary bars between heaven and earth Brett trembled more than once, but the creature was sure-handed, and shortly they were entering the topmost chamber of the tower.

The room conformed to the shape of the building, fifty feet in diameter, circular; and its walls, like the sides of the Drum-Ship were transparent. But for a number of hanging straps and a heavy red mat in the center of the room, it was bare. He had been puzzled by those hanging straps in the Drum-Ship, but now he was to learn their purpose.

Dropping him on the smooth floor, the beast crossed the room to a strap dangling to within ten feet of the floor, and climbed upon it. It constituted the decapodian chair, and from that vantage spot the weird creature surveyed him—like a spider watching a fly, was the man's thought.

Giving it stare for stare he slowly got to his feet. A sidelong glance showed him that he was nearest to the door they had come through. Could he reach it before the monster? Then his shoulders sagged. He could never get down that inhuman ladder. He was truly a prisoner, three hundred and fifty feet above the ground. With resignation he awaited the beast's next move.

It came as the monster flashed out a long tentacle that grabbed him up—and tossed him the full length of the room!

Dazed, he slowly struggled to his feet, wondering what sardonic play this was to be, when he found himself unceremoniously dragged back across the floor toward the beast. Yet no sooner had it brought him to its feet than it tossed him again against

the furthest wall! With rising choler he shook his fist at it, asking himself if first it intended to break his bones, before devouring him, railing at the thought that he was so defenseless.

His answer was repeated dragging over the floor, a third toss across the room, a third drag back. But the fourth toss found him lying where he had fallen, bruised and weak, mind in a whirl. Then into his consciousness came half-understanding. Suddenly he realized that with each drag across the floor had come a high piping tone from the monster. Even now it was piping at him.

Slowly he got to his feet, to try out his analysis. This time the engaging arm did not come out to meet him as he limped toward his master—answering its whistle.

He understood. He was being taught to "come here!"—even as he had taught his own dogs to answer his call—only less ferociously.

Reaching the spot just below where the beast was dangling from its overhead strap he paused, waiting. A tiny hand came down to pat his cheek, then to make certain he had really learned his lesson it shoved him away again—more gently this time. And with more alacrity the man obeyed the whistle. He had learned.

Slipping to the floor the beast next moved over to the matting where it squatted, drawing Brett toward it. He found himself laid upon the floor to the accompaniment of soft pappings and a chucking, like that used by a hen to call her chicks under her wing. Making no move, he awaited the creature's next action, and heard again the high whistle. Rising and coming to its side he received another pat on his cheek. He had learned to "lie down."

Several times this was repeated, then certain he had learned both simple lessons, the decapod appeared to lose interest in him, leaving him to his own devices for the time. But Brett did not want to be left alone. He decided it was high time to teach the monster that he, likewise, was a thinking creature.

Feeling around in his pockets he was disappointed to find he was without a pencil. In fact, his pockets yielded little else but a handkerchief, some coins and bills, a cigarette lighter without fuel. He remembered that on that memorable day when the decapods had invaded Washington, he had risen late, and failed to stock his pockets with his usual accessories. He didn't even have cigarettes.

However, that did not matter. He would try some other expedient. The decapod, he found, had its eyes turned away from him, was looking at the red sun that had sunk somewhat since they had entered the room, lying now just above the tower-tops. Going to its side, he tapped an arm lying in reach, to attract the creature's attention.

Slowly it turned its head to look at him, and even cocked its head when he addressed it, moving his lips slowly, forming words that he knew it, could not understand. A little hand reached out toward his mouth, but beyond that the beast showed little interest in his demonstration. Thereupon, he pointed toward the lowering sun, and squatting on the floor used his finger to draw an imaginary sun there. But he could have saved the effort. Glancing up again, he found that the monster had turned away, was rising to go to the open doorway.

He watched in despair as it peered outside, looking down at the ground, realizing that the creature's mind

told it that he was an inferior animal, and that was all there was to it. Having an intelligence of a vastly different order than that of Man, the decapods were unable to conceive the fact that an Earth-man was a thinking entity. Possibly to them Man was no more than a new type of animal; his buildings and industry having impressed them no more than the community life of an ant impresses the average man—aside from his wonder at the analogy of that life to his own.

Man to them was no more than the animals he himself domesticates. Possibly, too, they judged the buildings of Washington natural outcroppings of Nature, since they were unlike their own tower-buildings.

Thinking thus, Brett realized his own status, and that of his fellow-captives. They were pets,—nothing else. To be regarded as no higher a development than the creatures indigenous to this land, that, later, he was to learn, the beasts tamed for their own pleasure.

It was a hard pill to swallow, and sorrowfully he considered the plight of his fellows, wondering how they were taking this intelligence. Would they submit or attempt to fight back? He thought of the blue-eyed girl and of George. Would they appreciate their new standing and act accordingly? Then, he smiled as he thought of the Militant Matron and the pompous Senator. He'd like to have seen them in the process of their "training."

CHAPTER III

CONSIDERING these things the man realized that the room was growing dark, that the sun was sinking, painting the sky garishly in deep reds, blue and greens. But

before the chamber became wholly dark a newcomer entered.

Staying at its post beside the doorway, the first decapod suddenly began to chirp loudly in some excitement. Glancing through the transparent wall of the tower, Brett discovered that a second monster was mounting it. Immediately the room was filled with shrill tootings, and to his wonder the new arrival was giving the other a terrific whacking on its body and limbs.

He drew back, expecting a fight, but instead the pair settled themselves upon the matting in the center of the room quite amicably. He saw that the newcomer was somewhat larger than the first, ebon black in color, its tentacles more massive, its body thicker, whereas in contrast, the smaller beast was almost a chocolate brown. Could it be that they were male and female, and that this was an ordinary home-coming?

That it was, he learned in the days that followed. Each morning the black male left the city of towers in a small replica of the Drum-Ship that had brought Brett and his fellows here, returning at evening to the tower-room.

Following their greetings to each other, the smaller decapod, whom Brett dubbed Missis, for want of a better name—calling the other Mister in turn—dragged him forward to show him off to her lord and master. By her shrill whistlings Brett guessed she was explaining the happenings of the day, the Mogul's presentation of the pet to her. Mister did not appear overjoyed by the addition to his family circle, and it seemed to Brett that Missis was arguing with him about her new acquisition. But after a while they both settled upon the matting,

leaving Brett to make himself comfortable on the cold floor.

Sleep was far from his mind. In the first place he was uncomfortably chilly, and with the setting of the sun, the room had become cold, bitterly so. Also he was hungry, not knowing when last he had eaten; but even those considerations did not count as high as the predicament in which he found himself.

That he was no longer on Earth he realized; knowing that nowhere upon the home planet could such monsters have managed to subsist, to develop their sciences to the high degree that was apparent. Earth's moon, Luna, as a possibility, he could discount, since it possessed no atmosphere, and Earth would have shown in its sky. Venus, too, was out of the question, for the sun's rays would surely be warmer there than upon Earth. That left Mars as a possibility, else one of the moons of Jupiter—that is, if they were still within the confines of the solar system.

But considering the distance of Sol from its nearest neighbor, some twenty-five trillions of miles, he doubted that the decapods could have brought them so far, unless their machines had a means of traversing space faster than light itself.

No, things pointed more directly at Mars, the red-planet. That red sun and copperish sky, the slightly lessened gravity-pressure, the thinness of the air, thin, as if he were breathing upon a mountain top, seemed to indicate Mars.

Sitting upon the floor, looking through the transparent ceiling of the tower-room, he was given positive proof that he was actually upon Mars. From the east he saw a moon rising, a small round globe, inordinately bright, silvering everything

around him and blotting out some of the stars by its brilliancy. But that was not all. Even as he stared at the sky, a second moon was making its appearance, but unlike the first it came out of *the west*, out of the west, wherein the sun had newly dropped; whereas the first moon had appeared coming in the opposite direction!

This second satellite was even more brilliant than the first, but that wasn't its only unique feature. It acted as no self-respecting moon should, mounting the sky in rapid strides, blotting out star after star as it progressed swiftly to its zenith, which, according to Brett's wrist watch, would be reached in less than two hours!

Although not an astronomer he remembered enough of his university studies to realize that the two moons overhead were none less than the twin moons of Mars . . . Phobos and Deimos; whose brilliancy was due to their proximity to the surface, Deimos being only 12,000 miles or so away, Phobos, a mere 2,170 miles. It came to him, too, that Phobos' queer antics were due to the fact that its period was only about 7 hours long, whereas Deimos' revolutionary period was 30 hours, and that Phobos, in consequence, made three revolutions to Mar's single rotation, its apparent motion and actual motion being the same, so that it rose in the west and passed across the sky to the east for its setting, taking but eleven hours to travel from meridian to meridian.

Considering these factors the man was momentarily happy over his discovery, but his joy was short-lived. Mars—49,000,000 miles from home—forty-nine millions of miles of empty Space . . .

Shivering with cold in his thin summer suit, he crouched upon one

end of the matting, awaiting morning through the long watches of a night that seemed never ending.

HE must have dozed toward morning, but with the sun's rising he heard the stirrings of the monsters on their pallet. Here was no morning ablutions, no housekeeping facilities, but he found that the decapod went elsewhere for that. Plucking him from the floor the female led the way to the open doorway and started with him to descend the tower ladder, the larger and heavier beast following. Other beasts were leaving their domiciles on all sides, a general exodus of them.

Brett's searching eyes found a number of his fellow captives; the negro, Jeff, dwelt in a tower opposite his own, and as they reached the ground he descried the Militant Matron riding the arm of her chocolate brown mistress some distance ahead. Several other beasts, he now found, possessed pets besides the new arrivals. One bore a blue-skinned fish-like creature with a flat, seal-like head and long flippers. Another carried an animal with a distinctly fish head, ogling eyes and a long squid-like body.

It came to him then that life here had come out of the sea, that possibly even now they were living on the bottom of a sea long dead. He discovered that they were headed for the lake in the center of the wide plaza. As they reached the brink the decapods were plunging in, diving and splashing lubricously. Reaching the shore his own "mistress" dived in, taking Brett with her, regardless of the fact that he was fully clothed, and the water icy. Immediately his clothes sucked up water, dragging him low. Mistaking his trouble for an inability to swim Missis fortunately kept a

hand upon him, preventing his sinking, but shortly he was blue and shivering.

As they climbed from the water at last the pair of decapods oogled his sodden condition. Hoping he could do something for himself, the decapod dropped him on the sand. Hurriedly he climbed out of his garments, wringing out the water as best he could. His action, evidently, astounded the monsters; his disrobing appearing to them as if he had peeled off his skin. As he cast aside each article they picked them up to study them, tooting shrilly at each other.

Speculatively he looked at the sun; but its wan rays told him it would be hours before they could dry the clothes for him. Dolefully he replaced his outer shirt, then his trousers, damp and clammy, and draped the underthings and coat over his arm while he stuffed his socks into his shoes to prevent the leather shrinking, slinging them around his neck by their strings.

Mister spoke impatiently to Missis and Brett was once more picked up. He found they were headed for the huge building across the plaza that was the replica of the Royal Palace. They entered at the first level wherein the decapods were already at breakfast, standing before a long twenty foot high counter that encircled the room, behind which a number of the creatures were serving them food in large bowls.

Placed upon the counter between his mistress and master, Brett looked at the food, a thick, mushy substance that gave off a faint fishy odor. With large scoops, many times bigger than a man-sized spoon, the pair of decapods prepared to devour the ten pounds or so of the stuff that their plates held, but made no offer of any

to the man. He watched hungrily as they ate. Unappetizing though the stuff looked it seemed better than nothing, his stomach was clamouring for sustenance.

Then, when he was ready to give up, deciding he was not to be fed at all, he saw Missis lay down her scoop, and reaching out to Brett, shoved him toward the dish in which a fair amount of food remained. He understood. He was to have table scraps!

The man in him wanted to rebel, but in the face of hunger fastidiousness was gone. Picking up the scoop, he managed to get it to his mouth. He recognized the food as that which had been fed to him aboard the Drumship; both his hunger and thirst were quenched by it.

Along the counter he saw others of his kind, likewise making the best of the meal, while a number of the animals native to this unknown world wolfed down their own breakfast. Across from him, sat the Militant Matron. A deep puddle of water had gathered around her, dripping from every part of her clothes; her sailor hat hung limply about her face, and yet, somehow, she managed to retain something of her dignity as she ate from her bowl, daintily, with a natural-sized spoon. She would, thought Brett, be just the one to carry such an implement upon her person.

Finishing breakfast, the next thing on the program was to see Mister off for the day. In a large open space, adjoining the plaza was a landing field in which a great number of drum-shaped ships were parked, replicas of the one that had brought them from Earth, but smaller, large enough only to hold two decapods comfortably. Missis stood with Brett upon her arm until the ship of her spouse had taken off. The ship had

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neither propeller nor wings, but mounted straight into the air without visible means of propulsion. Brett would have given what little he owned to learn the motive principle.

All the ships turned in one direction over the city, and then Missis was returning to the lake-side where dozens of strolling decapods joined her, and among which Brett was glad to see a number of his fellows.

After showing him off to a number of her "friends" the creature placed Brett on the sand, watching warily that he did not run away. For the present he was interested only in his fellow-captives, anxious to learn how they had fared. His heart lifted when George came hurrying toward him.

CHAPTER IV

THEY each had the same experiences to relate. "They're treating us just as if we were dogs," averred George disgustedly, "as if we hadn't a grain of intelligence. And that bath! Ugh, I'm still half frozen."

Not far from where they stood the Militant Matron was talking to the pompous looking little man, whom Brett had dubbed the Senator, the woman waxing indignant over her treatment at the hands of her captors. In precise tones she was telling what she thought of creatures unable to recognize her true value, and complaining of indigestion brought on by their unnatural food, as well as her deplorable condition following her enforced wetting. Several times the Senator cleared his throat, trying to get a word in edgewise.

Huddled on the sands a little distance away were the three negroes, Jeff, the woman Mattie and the third, who was a mulatto, in a once neat over-fashionable suit, now water-wrin-

kled. The woman was moaning about the "punishment ob de Lawd." Standing by the lake, timidly surveying the others, was the spinster to whose arm clung the high-school girl in her absurdly high heels. She had made an attempt to keep herself presentable despite the condition of her bedraggled clothes. There was fresh rouge on her cheeks and lips that only made the whiteness of her face the more noticeable.

Three men, a portly elderly man who may have been a merchant, the nondescript clerk, and the fellow with the over inquisitive eyes, stood in a group discussing their predicament in low tones, glancing now and then at the decapods standing or squatting beside the lake, keeping an eye upon their charges.

Not far away, sobbing on the sands sat a small pink-faced young matron Brett had noticed the previous day. Her hands covered her face, while racking sobs shook her body.

Certainly, nowhere had Brett seen a more despondent-looking gathering. Then he forgot them all, as he discovered the girl he was hopefully seeking. She was leading the six year old child who clasped a damp kitten to her breast. Feeling his eyes upon her, the girl came to Brett's side.

"Jill is worried about her kitten," she told him, "the poor little thing seems ailing."

The child held up her kitten for him to see, but he had to admit he could do nothing for it. Snuggling it close, the tot dropped to the ground, all her concern wrapped up in the little cat.

Again the girl's eyes met Brett's. She smiled warmly, "Please pardon the dishabille, but I left home too hurriedly to have my luggage sent ahead." Then she added, "I'm Dell Wayne by the way . . ."

Her flippancy in the face of their predicament shocked him for a moment, then he grinned. He liked a girl who knew how to laugh. He realized that they may need a little laughter here. And she did look disheveled with a long slit in a water-stained silk skirt, a sagging wool sweater upon which a tie whose color was none too fast, had left a scarlet smear. Also, her hose and slippers had been removed. Carrying his own shoes and underthings and wearing only trousers and shirt he realized he himself was a none too prepossessing figure.

"I was just wondering when the next mail goes out so I can send for my wardrobe, particularly a bathing suit," he rejoined, adding, "Incidentally, my cable address is Brett Rand"

She did not answer because she was listening to the words of the "Senator" and the dehydrated spinster who came strolling along. They heard the woman saying: "Isn't this awful, Congressman Howell? Oh, you'll do something to get us out of here, won't you? Oh, I know you will. I said to Cleone—she's one of my pupils—why with Congressman Howell here, everything will be all right!"

He replied: "Ah, Miss Snowden, of course, of course—er—I shall do what I can. I shall—er—see that these—er—monsters learn who I am. The United States is not going to permit them to get away with this—er—high-handed sort of thing. Now, Miss—er—Snowden, don't worry at all. I shall have us all—er—all back home before this—er—day is over. I'm—eh hem—on my way now to see some—er—thing in—er—er—authority," And he moved away.

Dell Wayne sighed for him. "Poor dear, I'm afraid he's going to be terribly disappointed."

Brett glanced at her covertly. "You seem to have taken this thing neatly on the chin, Miss Wayne. . . ."

Her chin lifted sharply. "What else are we to do? Oh, I realize that we're in an awful position, far from home, slaves of things that don't realize our capabilities. We won't be able to stand this sort of life they're forcing on us, the cold, the dousing in the lake, the food but I guess that old saying is right—'Where there's life there's hope', perhaps we can find a way out of this mess, somehow. Can't you think of something—?"

"There's one chance—to get a ship to take us back home, but I admit that, even if I had a ship, I'd not know what to do with it," and he recounted his experiences with the machines of the decapods previous to his capture.

They spoke of these things for some minutes, each making impossible suggestions, when George came up to them carrying the eight-year-old boy, followed by a gangling fifteen year old who hung back, eying the group as he anxiously waited for them to notice him, to draw him into their midst.

"Say, can't something be done for this kid?" George asked. "He's running a fever"

Dell took the boy and brought out a handkerchief. "He's burning up. Someone wet this for me, please."

The fifteen year old, whose name turned out to be Forrest Adam, ran to do her bidding, but beyond dampening the little boy's hot face, they could do nothing for him. All he could do was to cry for his mother.

The woman who had been crying on the sand came over. "Give him to me," she ordered. "He's just the age of my little Jacky at home. We can understand each other's needs." But even as she took the boy from Dell the

beast, to whom he belonged, came to pluck him from her unwilling arms, taking him away.

Other decapods were reaching out for their charges, and Brett had only time to call goodbye to Dell and George, when, he, too, was lifted up and carried "home."

CHAPTER V

REACHING the tower-room Missis proceeded to inspect the sodden clothes Brett had been carrying, and, without so much as a "by your leave," began to undress him completely. The man tried to fight her off, but the monster paid his struggles no attention. When her little double thumbed hands stumbled over buttons, he, perforce, assisted her, rather than have her pull them off.

When that was done she commenced to dress him again, with his assistance, putting on the garments he had discarded, now half dry. Some she tried to put on backwards, but he corrected her. Yet, no sooner was he reclothed than she started the whole business of undressing him again, like a child with a new toy.

Resignedly the man allowed himself to be dressed and undressed until she tired of the play; then when she lay on her pallet for a nap, he was glad to follow suit. But he could not sleep. His mind was too full. He realized with Dell that unless something were done shortly, all those who had fallen into the hands of the decapods with him, would be dead. It was his fault entirely that George was here, but though he had tried to broach that subject, to tell how he regretted having gotten his chum into this mess, George had shut him up immediately. If it was only for what he owed George, something had to be done—

and there were those others. A plan was already forming itself in his mind, yet it was too intangible a thing upon which to put much faith.

Several days slipped by, the program being the same as on the first day, beginning with the forcible wetting in the lake, the same food, seeing Mister off in his flying ship, meeting fellow-captives on the lake-shore for an hour or so before returning to the quiet of the tower-room to await Mister's nightly return.

McCarthy and his horse, as well as the wire-haired terrier had shown up the second day, and Brett had made the acquaintance of the rest of the Earthlings, the inquisitive man who turned out to be a news reporter, the merchant, Thomas Moore, Hal Kent who was a government clerk instead of a haberdasher, Cleone, the high-school girl who usually could be found clinging to Miss Snowden's thin arm.

McCarthy's concern was only for his horse, which was evidently dying on its feet, unable to digest the food of the decapods. The fifteen-year-old, was perhaps the only happy person in the whole gathering. He had confessed to Brett that though he had read avidly all pseudo-scientific stories he could lay his hands upon, he'd never dreamed he would actually partake of such an experience. He was certain that rescue would come!

Jerry Ware, the reporter, was almost as cheerful, his mind centered only upon the scoop that should be his, when they got back "home."

And more and more Brett realized that that home-coming had to be soon. The conditions under which they were living were already telling upon the majority. Not only was the little boy, Tad, dying, but Jill was running a fever, and everyone could complain of indigestion, headaches, nausea and

colds. None of them knew what it was to be comfortable, thinly clad as they were, with what clothing they possessed rewetted each day; the nights reaching almost freezing temperatures. The fact that the kitten and horse were first to sicken, with the younger children coming down with fever, proved that the food was altogether too rich for their constitutions, and it would be only a matter of days before the adults would become feverish as well.

Considering this, on the third day, Brett suggested to those who listened the necessity of vigorous exercise to offset the ill-effects of the food. The younger members of the party were willing enough, but under the leadership of the Militant Matron, who was really a Mrs. Joshua White-Smythe, the others had other plans. She explained. "We're going to follow the canal out of this place—and walk home, if necessary. The canal must lead to a river, and rivers always go to the sea. . . ."

Brett heard and objected. "Good heavens, can't you people realize yet that you're not on Earth any longer? That it's not a matter of 'walking home'?"

There was a tense moment, then Mrs. White-Smythe swung a pair of supercilious eyes upon him. "I suppose you think we're on the moon. Silly idea. As if anyone could live on the moon—or stars!"

"I'm afraid we're a lot further away than the moon, madam. Earth is far enough away to appear as a star to us now." Brett was certain he had picked Earth from among the celestial bodies the previous night.

Congressman Howell laughed at that. "Of course we're on Earth. I know we are. We're in the Gobi desert!"

"Why, of course. Haven't scientists been finding large bones here, and calling them dinosaur bones?" sniffed Miss Snowden.

"But these creatures haven't bones—ugh—they don't feel like they have them, anyway," spoke up Cleone.

"The next thing you'll be saying," said Howell severely, "is that we're on Mars. . . ."

"We are 'on Mars!'"

"Mars!" It was a bombshell.

Dell who had been nursing Jill in her arms came to Brett's side. "You're sure of that?"

"Gee—I knew it," cried Forrest. "Those moons, they're Phobos and Deimos, aren't they, Mr. Rand?" (So much for his voracious study.)

Brett explained his reasons for his contention, pointing out the lessened gravity force, the red-dust atmosphere, the lessened warmth of the sun's rays, the presence of the twin moons, even now showing in the daytime sky.

George nodded. "Sounds logical, Brett. I've considered the same possibilities myself, but look here—scientists claim there isn't sufficient oxygen on Mars to sustain human life. This air is thin, but breathable. . . ."

Brett agreed. "I thought of that too, but it's my conviction that this city lies in a deep depression in the surface. From my tower, I can see a distant line of cliffs on the horizon—either a mountain chain, or the rim of this valley. If it's the latter, we're on some ancient sea-bottom. That would explain why astronomers have never detected oxygen in the atmosphere—because it lies below the surface!"

"Gosh, that sounds reasonable."

"Say, you know astronomers have plotted out some 'marshy areas' that show seasonal changes," put in For-

rest, "they usually show up at the end of a canal. I guess we're in one of those areas, huh?"

"Possibly."

"Yes, but what of those seasonal changes, Brett? Observers have seen green spots, you know, following the dissolving of the icecaps."

"This, I imagine is the dry-season. I stumbled over some dried-up roots this morning. Wouldn't be surprised, if at certain seasons, some sort of vegetation grows here . . ."

"Glory be, Let it come right away. Prince and I need it," McCarthy put in.

Suddenly there was a sobbing in the crowd. It came from Mrs. Burton, the young matron who was rocking Tad in her arms. "If what you say is true," she murmured through her tears, "then—I'll never see my John or little Jacky again . . ."

Cleone added her tear-filled voice. "Oh, I'll never disobey Mama again. She warned me not to go to the Point to see that awful ship. Oh, I wish I was dead!"

"Hit's de punishment ob de Lawd."

No one noticed that, led by Howell and Mrs. White-Smythe, Miss Snowden, Moore, Kent, and the mulatto, Harris, were leaving the circle. Even their mistresses did not notice as they moved slowly along the like shore toward the place where the canal joined the lake.

"You'll save us, won't you, Brett?" asked Dell. "You'll find a ship and get us home—before its too late . . . ?" She looked down at Jill lying in her arms, a tear spilling on the child's cheek. Brett noticed that her voice held a slight strain of hysteria.

He drew George aside to tell him of his plan. "I've not been idle. I've been making a play for that big brute of mine, been jumping all over him

when he gets home nights, turning hand-springs—anything and everything to make him notice me . . ."

"Good idea, and yet . . ."

"Oh, I know there's plenty of objections. Still its better than no plan at all . . ."

"Sure, Brett, I'll do the same thing—perhaps one of us'll succeed."

CHAPTER VI

THAT night when Mister came home, true to his word, Brett literally flung himself on the monster, doing everything in his power to make the big fellow notice him. He had already discovered that the audibility of his voice-tones was below the sound range of the decapods; that partly accounted for the fact that the Earth people had failed in making the beasts realize their mental rating. He could roar at the top of his voice and the creatures paid no heed, no more than they heard his stirrings around in the night. Their voice-range, on the other hand, was often above his own sound-range, their lowest key was either a high "d" or "e." He could see their mouths move without hearing their voices, and the male's tones were even higher than those of the female.

Hence his only way of attracting attention was by his antics, and by taking a flying leap, with the aid of the lessened gravity, he would land high on Mister's body, clinging there until, perforce, the beast would put out a hand to steady him, or pluck him off. And the creature appeared to like these attentions. On the fourth morning he even deigned to give Brett a scoop of food from his plate.

That same night Brett found himself the recipient of a new piece of attire. It consisted of a heavy metal

girdle fastened to a forty-foot long metal cable. He had seen one of the seal-things wearing a similar belt and leash, nor did he like its implication, not guessing that later it was to prove his salvation.

In the middle of the night he became horribly sick. He was cramped, and had a dizzy headache. And like most of his companions he was suffering from a bad head-cold, that the bath of the following morning did not help.

And to make matters worse, on leaving the dining hall, Missis made use of the leash, snapping the belt around his middle and placing him on the ground. He was forced to run top-speed to keep up with her. Reaching the "air-port," he examined the girdle's buckle, but it was of an intricate mechanism that he could not unfasten. It angered him, because he had intended to run after Mister, make him understand that he wanted to spend the day with him. But the leash foiled him.

He was, of consequence, the most despondent of those gathered on the lake-shore that day, eyeing his be-draggled, ailing fellows with jaundiced eye, realizing more fully how very bad they all looked, wan, listless. Then he gave a start. He almost chuckled. Nothing could be more ludicrous than the sight before him. The Militant Matron was sporting a black-eye!

Studying her further, he discovered that she had somehow in twenty-four hours been subjected to considerable mauling. Her face bore other bruises beside the shiner, and her clothes were almost in tatters. Also she was limping. . . .

She, however, was not the only one who appeared to have sustained maltreatment. The Congressman, al-

though he did not have a black-eye, looked equally as bad as she, all semblance of neatness gone, his face scratched and bruised, while one trouser leg was ripped from knee to cuff.

Glancing quickly around Brett found others in the same pitiful condition, Miss Snowden, Moore, Kent and Harris were likewise in a ragged, bruised state. And all looked rather hang-dog about it.

Shortly, he learned what had taken place when the six had wandered away from their fellows the previous day, intent upon finding their way back to civilization. Hurrying along the canal, it seemed, they had made good progress. The canal had widened out, the towers growing more sparse, when they found themselves stalked on all sides by strange decapods. Then they had been surrounded.

At first the curious creatures had been content with poking at them, pinching them; but tiring of that, one had plucked Kent up. From one beast to another he had passed. The others struggled, but were each plucked from the ground. Then had come squabbling among the ever increasing number of monsters, those on the outskirts resenting the slowness with which their fellows examined the curiosities. Fights started here and there, until it was a wonder the Earthlings were not torn limb from limb. Only the timely intervention of a troop of decapods wielding club-like metal rods and saved them. Taken to a massive tower building they had been turned over to creatures of some authority who examined them thoroughly. Later, they had been returned to their own mistresses, much the worse for the experience.

So ended the first break for liberty.

Howell kept away from the others the remainder of the morning, but when he could catch Brett's eye, he motioned him to come to his side. "Young man," said he, "I do not believe this—er—story of yours about our being upon Mars—but—er—a—you strike me as a man to be depended upon. I heard you making plans with your young friend. Now, listen to me. You—er—get me out of here, and I'll pay you well—er—ten thousand dollars. No—I'll pay fifteen—twenty, whatever you say. Only save me. I'm sick—I'll die unless I get medical attention—but for God's sake get me home . . ."

Brett listened quietly enough, though with every word his gorge was rising, but he managed to keep his voice under control as he asked, "And what about the others, Congressman . . . ?"

The man hemmed and hawed a moment, then: "What of them? Let them get out as best they can. After all, I am needed in Washington, I have my duty to perform. Two of us have a much better chance—whereas . . ."

Had the man been younger Brett would have struck him down. He had much he would have liked to say, but he knew he could not trust himself if he let himself go, so he turned on his heel, after one scathing look. It was the last and only time Howell approached him, but he did, later, draw George aside. That young man, however, saw fit to give him a piece of his mind, telling Brett about it later.

"The dirty-so-in-so. Thank God, he's only one out of the rest of them. It's men like him that . . ."

But Brett waved aside his denunciations. "Forget about him. Listen, we've got to do something. Understand? We're all sick, dying on our feet. We've got to have some setting-

up exercises to offset the richness of our food, and general conditions here. Moosey around and see if you can't start something."

"Yeah, I know. The kid, Tad, didn't show up this morning. We're afraid he's dead, and the baby Jill is getting worse. It won't help that her kitten died last night, either . . ."

Brett's proposal was received in various ways. Howell positively refused to join the group, the negroes grumbled and refused point-blank to do anything for themselves, the three of them forming a praying bee around Mattie whose high hysterical voice was beginning to color all their dreams. Surprisingly it was the Militant Matron that jumped at the idea, organizing the group, wading in after slackers, leading the calisthenics. It was the outlet that she had needed to adjust herself. Brett grinned secretly. He bet with himself that the mayor, as well as all the *worth-while* people of her home-town, usually toed the mark when she was about.

The next day Brett had his piece of luck. Jumping at the end of his long leash, trying to make Mister understand he wanted to accompany him to the office that day the catch on his belt suddenly gave way, freeing him. It took him but a moment to realize his advantage, and without a backward glance at Missis, he started on a run after the departing male, about to board his ship. Making a flying leap, he landed on one of the beast's five legs, clung there for dear life.

CHAPTER VII

MISTER halted in his tracks, Missis came running up, but reaching down for the man. Brett clung to the male, refusing to be pried off. With much shrill tooting

the pair conferred. The female appeared to object to leaving her pet to Mister's care, but his careful ground-work seemed about to bear fruit. The beast hesitated.

Then to his chagrin, at a word from Missis, the male held him out to her. Shrieking at the top of his voice and digging his fingers into the leathery tentacle, Brett again refused to be freed. Missis gave him a long glance. He took it for reproach, but didn't care. Then she said something to Mister that made that worthy chuckle. Thereupon, she turned away, leaving Brett in full possession!

With beating heart he rode his master's arm. They entered the waiting machine. It contained two compartments, the first holding the controls and two queer motors, the second bare, but for a mat and a few hanging straps. High on the wall of the control room was a huge plaque studded with dials, levers and buttons, and before it hung a series of straps in which Mister slung himself.

Carefully the man, squatting on an arm, watched the decapod manipulate the controls. One small hand depressed an octagonal-shaped lever, a second hand turning, in quick succession, three knobs, each of different form. At the touch of the lever the ship was filled with a terrific roar, and with the twisting of the dials came such pressure that Brett lost consciousness.

But the spasm was of short duration, for when he reopened his eyes, they were just leaving the sanded floor of the port. Unaffected by the concussion of the take-off, the beast was twisting a long red bar, which, after he took his hand away, began to oscillate jerkily, continuing to do so all through the trip that followed.

Since the ship was made of the golden transparent metal of the decapods Brett could look in every direction. He saw that they had risen above the tower city, a thousand feet or so, and were now moving away in a straight line. Looking through the floor he could see the plan of the city, a mass of towers, intersected by two canals, dotted with plazas, an occasional monster tower rising high above its fellows. The city had more length than breadth, and he discovered that, true to his supposition, it lay in a deep depression in the planet's surface. Far away, on either side, was the rim of the valley, great dark cliffs.

They were following one of the two canals, and when the city ended abruptly, strips of some growing stuff of bright unnatural green took its place. Here and there monster gardeners tended the plants, keeping a steady flow of water in the ditches from the canal.

Where the canal made a great bend they deserted it, rising over the valley rim into a land that was naught but sand, silent dunes that lay supine, or swirled under wind-eddies. Shortly, a second city came to view, standing beside a second canal. The towers here were twice the circumference of those left behind, but much lower, none rising more than seventy-five feet. Interposed among them were other strange shapes of structures, some tall and slender, others squat and flat, or many sided. Then, there were cone-shaped edifices with the cone's point toward the ground, the wide, flat plane at the top, upheld by interlaced girders. An evil-looking, green smoke rose from many of the buildings, showing why the decapods set their factories far from their residential cities.

Between this conglomeration were

wide plazas in which flying machines were already parked, or just arriving. Other machines had preceded them or trailed them from the city of towers, while more approached from opposite directions. As soon as they landed, their pilots hurried into one or another of the various shaped piles.

Realizing they were about to land, Brett clung tightly to Mister's muscular arm, trying to keep his eyes open to watch how the landing was made. A touch halted the oscillating bar, the three knobs were twisted to their original position, and the ship was floating to a landing as lightly as a feather.

THEY entered a round building filled with activity, monsters moving among queer machines that covered most of the floor space. At one end of the long chamber stood a high counter, and it was to this desk that Mister hastened. Climbing to his hanging "chair," the decapod placed Brett on a clear space on the counter itself, pushing him down to indicate that he was to stay where he was put.

On a wide plaque in front of him was a series of bars, odd-shaped knobs and round flat keys, and without wasting time Mister set to work, depressing keys and twisting knobs. Sometimes all five hands were engaged; again only one. Brett had no idea what it was for, but as the decapod glanced occasionally at the various throbbing machines, he concluded that this control-board was, in some way, connected with them. If only he could have asked questions!

The monotony of watching those moving hands made the man drowsy. A touch, later, awoke him. Mister and he were surrounded by several machinists, the machines were stilled.

Brett was placed on the floor and was commanded by Mister's tootings to "jump." This meant turning hand-springs, somersaulting without number, making high leaps into the air, flip-flopping and what-not. Brett had always been proud of his muscular control, and Mar's gravity allowed him feats he could never have accomplished at home. Then, he was picked up, handed around as each monster examined him, texture of skin, hair and clothing.

Placed on the table again, he watched the machines restart, and for several hours Mister worked silently and efficiently at his task. Brett wondered at the activity, but there was nothing to tell him what was being done, since the room was otherwise bare except for the machines. At last, the machines were stopped once more, and there was a general exodus from the building. The work-day was at an end.

Outside, the man was the cynosure of all eyes, and had to show-off again for his master's fellows. This time, when they climbed into the flying machine, he was prepared for the take-off, managing to hold on to his senses as he watched everything the pilot did, memorizing each process.

He felt better for what little he had accomplished, having forged the first link in the chain that meant escape, but he foresaw that it was not to be as simple as he had hoped. There was the question of the ship's space-worthiness, of fuel. True, he could see no outlet but the single entrance, which, by its very solidity, pointed to the fact that, once closed, it hermetically sealed the ship. But there was also the question of how he and his companions were to manipulate those giant controls. He could, undoubtedly, reach them from the hanging straps,

but were Earth muscles equal to turning them?

His fellows crowded around him the next morning. They had guessed his absence of the previous day had to do with the workings of his plot to escape. He narrated all he had seen, but told only George of his many fears. "We know nothing of the machinery, not even how the ship is fueled. And we'll be taking a chance on its space-worthiness."

"You saw nothing that looked like fuel tanks?"

"No. My guess would be that the power is derived either from stored energy in the machines themselves or from solar or cosmic rays . . ."

"Hum—that is a problem. But say, I tell you what. To-night, let's sneak out and give these ships a once-over, top to bottom. We can't wait much longer. Jill died in Dell's arms yesterday. She's pretty much broken up over it. Mrs. White-Smythe keeled over, too, and we had a difficult time of it, bringing her around; and several others are mighty sick . . ." Even as he spoke George was doubled up with a cramp that twisted his face and made him catch at Brett to keep his balance.

"Yes, I realize we're all in a bad way. Getting many of those spasms, George?"

"Oh, I'm all right, so so, anyway. Yes, we've got to get out of here . . ."

"But what's puzzling me is how we're to get out of the towers? Drop from rung to rung? You and I might manage, but how 'bout the others—the women . . . ?"

"I've got that figured out, Brett. Most of us have leashes now, you see. Here's what we'll do," and George explained his idea. They planned to meet an hour or so after sunset, with the rising of Deimos.

CHAPTER VIII

IT seemed to Brett that Missis and Mister would never fall asleep, but at last their quiet breathing told him all was well. Tip-toeing more from habit than need, since he knew his nocturnal stirrings never disturbed them, he crept to the open doorway. Deimos was just showing over the rim of the valley leaving the ground still in shadow.

Picking up the long cable of his leash he studied the ladder below him. Luckily, one of the rungs was fastened just five feet beneath the doorway. It was broad and round, jutting out from the building's side some two feet, its end a broad knob.

Swinging over the door-sill, he felt around with his feet until he found the rung, then balancing himself carefully slid down until he straddled it. Next, he pulled the cable that he held in one hand after him, and draped it over the rung so that its ends hung clear, dangling several feet below the next rung beneath. Taking both sides of the cable in his hands, he went down until his feet met the step.

Chuckling over the simplicity of the thing, he repeated the same performance over and over again, until, at last, the ground was underfoot. For a few moments he stood listening, to discover if his descent had disturbed any of the neighbors, but the decapods were all sound sleepers, nothing stirred in the night. Coiling up the cable, he hastened, to his rendezvous.

George was at the landing field before him, since his tower home was nearer. In the moonlight he was inspecting one of the flying machines.

"You're right," he told Brett, "these things have no storage tanks

of any sort, but look here, what do you make of these?"

He pointed to a mesh-work of wires embedded in the very stuff of which the golden ship was made. In the daylight they would have appeared invisible, but the moon's rays glinted upon their surfaces, silvering them.

"Antenna! There's some way of drawing power out of the air. Whether it comes from artificial beams or from the cosmos itself, there's no telling. Possibly, we'll never know, but I'd take a chance its either solar or cosmic rays—they couldn't broadcast a beam from here to Earth. Of course, we could tell better if only we could find that big ship that brought us here . . ."

"How 'bout trying this one out? We might as well learn if we can handle it . . ."

Brett thoughtfully paused to consider the question before giving an answer when they both grew aware of the fact that they were not the only ones abroad in the city. Across the plaza loomed the figure of a huge decapod. In one hand it carried a long metal bar. "A night watchman . . ." breathed George.

Luckily, they were unseen as the beast was gazing in an opposite direction. Hastily they dodged under cover among the massed machines, watching breathlessly until the police guard turned back among the towers.

"Whee—that was close! Wonder what these things have to guard against? They haven't anything for anyone to steal!"

"No telling, no more than we cannot explain lots of things about them. I guess this ends our chance at trying out the ship. No use giving our hand away yet. We've got to make the break *en masse*, and take the consequences . . ."

They went in one of the ships to study the controls, but there seemed no connecting links between them and the motors. They were as much in the dark as before.

A paling of the stars in the east warned them that morning was at hand. Separating, they hurried to their respective towers. On the way Brett all but ran into a second guard, moving between the buildings. Again luck was with him, and he slipped out of sight. Reaching his own tower, Brett was faced with the monumental task of reascending the glassy wall.

A running jump carried him high enough to grasp the first of the ladder rungs, but from there on it was a gruelling job of lassoing each succeeding rung, standing upright and hooking the cable over the rung above his head. The sun was showing above the valley rim as he swung his foot over the sill of his chamber. In a few moments the beasts had begun to awaken.

That same morning Brett apprised their fellows of the details of the plot that George and he had carefully worked out between them. Looking around he realized that there was no time to lose. They were all sallow, pathetically thin. Everyone had a cough, sneezing and wheezing. A few had to hold their chests when coughing spasms seized them. And they were all sick from the rich, unnatural food of their captors. Even Dell who had been the most uncomplaining showed a peaked, wan face in which the blue eyes seemed over large and bright. Only the little dog, Jock, did not seem to have suffered any. Each day he had friskily re-greeted the new friends he had made.

"I'm not going to conceal any facts from you," Brett explained. "We've possibly one chance in a thousand to

get home. For one thing, these flying machines may not be hermetically sealed, and once we're out in Space, we'll suffocate—even so we don't know how long our air will suffice without renewal—not very long, anyway. Secondly, we're taking a chance on fuel. Then, again, we don't know, when once in Space, if we can find Mother Earth. None of us know a thing about spatial navigation, we're none of us astronomers, and we may miss Earth entirely—and fall into the Sun. In fact, I'm afraid that a thousand to one chance is a small margin....

"But we do know one thing, and that is, if we remain here much longer, none of us'll live to tell the tale anyway. We're dying on our feet, so it's up to each of you to decide for yourself. You must come willingly...."

HE did not know whether it was the "hope that springs eternal" or whether it was a fatalistic courage that caused them to give a unanimous consent, but there was not a single nay in the little gathering. Even, Mattie who had insisted right along that this was "Gawd's judgement" found it in herself to let loose a wild Hallelujah.

Each member of the party was told just what he or she was to do as Brett warned them that the first step toward escape depended largely upon themselves, illustrating how the descent from the towers was to be accomplished. A count showed that three or four of their masters had neglected to provide their "pets" with leashes, and therefore, it fell upon several of the stronger men to help those unfortunates. The hour set for the exodus was at Deimos' rising.

As Brett flung his leg over the sill

of his doorway, he saw the dark shadow on the neighboring tower that he knew to be the big Negro, Jeff. Almost at the same time both reached the ground and, as pre-scheduled, hurried to the building that had housed the Militant Matron. They saw her peering out the third story chamber, waiting for them. She had a leash, but the nearest ladder rung was ten feet below her.

The Negro, to Brett's surprise, insisted upon going up after her, explaining that besides being a "champ-eeen" riveter who knew his scaffolds, he had also served on a western ranch as a cow-puncher. And true to his word he lassoed the rung above Mrs. White-Smythe's head, carefully paying out the cable until its other end swung to the woman's waiting hand.

Bravely the heavy matron dared put her weight upon it, carrying the Negro on the other end aloft, until she reached the rung from which he had been lifted, hanging on until he could join her on the single support. When, at last, they reached the ground she had something to say to the darky. "Boy," said she, "if you're ever out of a job you come see me. I never believed I'd get out of that place alive!"

Proceeding on their way the three picked up Jerry Ware the reporter who had with him the little school-girl, Cleone, and Mrs. Burton, impatient over any delay that might keep her longer from "John" and little "Jacky." The rest of the Earthlings were housed on opposite sides of the plaza, and were to meet them later.

Brett led the way to the great dining hall, now empty; keeping his eyes open the while for "police men," but not a single decapod showed up to halt their progress. The moonlight shone on the long high counter behind which stood the large vats of

Martian food ready for the morning horde. Bad as the food was for them, part of the plan was to carry off a few casks to sustain them upon their homeward journey, for the Earthlings had no way of knowing how long that trip was to be.

However, since there was no opening in the counter, they had to devise a way of getting the casks over it. The decapods simply stepped over the barrier, but not so the Earthlings. Jeff, the tallest and huskiest of the men was made the under-stander, and Ware climbed to his shoulders. He was slenderer than Brett, and Brett knew that the reporter could never haul either himself or Jeff to the counter's top, so it became necessary for Brett to climb up first. Standing on Jerry's shoulders, that threatened collapse, he swung himself to the edge of the counter, and managed to draw himself upon it.

Uncoiling his leash that was slung around his shoulders he dropped its end into Jerry's hand and quickly hauled him to his side. Together they drew Jeff to the counter top. It was Jeff who held the cable for Jerry and Brett to slide down to the floor on the other side where stood the vats.

The vats were great open containers, but stored to one side were dozens of tubs, six feet high and four in diameter. Turning six of them on their sides the men rolled them in position below Jeff. The cable end was tied securely around the first, and Brett skinned up the leash to stand beside Jeff and help in drawing the heavy cask to the counter-top. That done, they rolled it to the other side, and slung it to the floor where the women there untied the noose. One by one the other tubs were lifted over the counter.

As they toiled more of the party

made their appearance as scheduled, then the heavy tubs were rolled out of the hall toward the machine the Earthlings had chosen for their escape. When the containers were inside Brett counted noses. Everyone was there—except McCarthy.

The boy, Forrest, remembered having seen McCarthy that night. "I called him," he said, "but he was going the other way. He just waved and called back that he'd be along directly . . ."

"Hum—I guess he's gone to the grave of his horse to say good-bye. He took Prince's death hard," observed George.

"Here he comes now!"

McCarthy was coming on a run, something white clutched under his arm. It was Jock, the wire-haired terrier. "Glory be," said the man as he caught his breath. "I just couldn't leave this little feller behind, even if he is only a dog . . ."

"Well, come on. It'll be light soon. Inside everyone!"

The fifty foot ship held them all, and the heavy door was swung closed. Then Brett and George climbed the straps until they were opposite the control plaque.

With his heart in his throat Brett tentatively touched the octagonal lever that he had watched Mister depress, after warning everyone to beware of the take-off. He was astonished at the ease with which the lever reacted under his hand. A light touch depressed it. But it was more difficult with the three knobs. It took both George and him with all their combined strength to turn them. Then, they waited for the roar of the take-off.

IT DID NOT COME!

CHAPTER IX

BRETT and George stared at one another. They could feel a slight pulsation throughout the ship, but that was all.

"Maybe we didn't twist the knobs far enough . . ." whispered George. Brett nodded. Again they worked on them. They found they could turn them still farther; yet nothing happened!

Again the pair looked at each other, neither daring to voice his thoughts. Below them, their companions grew restive, wondering at the delay. It was Forrest who had a suggestion.

"Maybe—it's because the sun's not up—that it depends on the sun's rays . . ."

Brett glanced thoughtfully at the boy. Perhaps he was right. One guess was as good as another. Lifting his eyes to the east, he saw that the sun would rise shortly.

A bright red was already tinting the sky. Then—gradually, so slowly it seemed it would never break the mist on the horizon, a slender sliver of blood red cut the gloom.

"THE SUN!"

Never had sun worshipers greeted that orb with more fervor, but their exultation was of short duration.

With a roar that was like a dozen claps of thunder, the ship sprang into action, mounting the sky so rapidly no one within witnessed the take-off. Thrown to the floor by the terrific pressure, they lost all consciousness and the machine was a wild thing climbing straight into the heavens.

Out of the blackness of oblivion Brett, at last, opened his eyes. He found himself on the floor below the strap to which he had been clinging. Beside him lay George, not yet stirring. Here and there someone moaned,

tried to get up. And it was only by concentrating all his will that Brett was able to lift a hand, then his head, and lastly his body. It was as if a thousand pound weight held him down.

He realized that the copper-sky was already losing some of its color, that Mars was dwindling rapidly beneath him.

Panting, he strove to reclimb the straps, to reach the controls. Fighting the pressure was like fighting a monster. He got to his knees, bringing one foot forward to jack up his body. A hanging strap came within reach of a hand, and that helped. His climb upward was a bitter thing to watch, so slow, so painful as one dragging hand followed the other, like something out of a nightmare, or a slow-motion camera.

Opposite the controls at last, he was uncertain of what to do. Should he twist the red lever as Mister had done to level off the flight? Or twist the dials to starting point? Sluggishly his mind milled over the question, then he decided, first to start the oscillating bar.

Eyes blurred with the sweat of his gigantic effort, he felt rather than saw the bar. The lightest of taps started it oscillating and he almost screamed with joy when he found the pressure subsiding. Soon, he was feeling normal again.

The others were rising to their feet; George climbed the adjoining strap to his side. "We've done it! We've done it!" came the cries from all sides, as they forgot the ordeal they had just experienced, staring with fascinated eyes at the copper ball rolling off to the right, its form becoming more evidently diminishing. They had left Mars behind—were in free space!

For a while George eyed the oscil-

lating bar. Then he spoke. "Now what?" he wanted to know. "How do we guide this thing?"

Brett pointed to the bar. "Mister swung that right or left—but your guess is as good as mine. Where is Earth?"

Together they looked into the great panorama of the firmament spread out before them like a great black velvet mantle dotted with multicolored jewels. The sun glowered at them like an evil enraged eye.

"There's the sun, directly ahead. Ugh what a furnace. Earth must show somewhere in its vicinity—with Mercury and Venus. We ought to know it because it will show its phases to Mars, like the moon does to Earth . . ."

"Righto . . . There—see that pale green star there—see, about a degree beyond the silver crescent—in half-moon. That's Earth, George, I know it is!"

GEORGE studied thoughtfully, turning now and then to eye other glittering objects round about. After a while he was ready to conclude that the greenish half-moon was Earth, the silvery body below it, Venus. "If only we could see the moon alongside, we could be certain."

On the floor beneath them was Forrest listening to their conversation. Suddenly he cried out. "There it is! See that faint glow of light along the dark side? It's the moon—LUNA!"

They, too, found the light-glow he spoke of, showing faintly along the planet's limb. It was sufficient to convince them that the pale green planet was Earth. But how to head their ship in that direction was their quandary. It seemed that the ship lay in a course diagonally across the heavens.

Tentatively Brett touched the oscil-

lating red bar fearing to halt it altogether, but it did not stop as it moved in its socket. They waited breathlessly. "It's working . . ." cried George, "only we're swinging more directly toward the sun . . ."

Again Brett pushed the stick ever so slightly. Again they waited. The sky seemed to swing around them as the green half-moon moved slowly until it lay directly in their path. Those below who had listened quietly to the pair of engineers cheered, certain now that their pilots were to bring them home—safely.

"Guess there's nothing else to do here now, Brett. Might as well climb down and let the ship do the rest . . ."

But Brett thought differently. "No, one of us must stay on duty at all times—to keep an eye on the 'stick.' We can know if the ship leaves her course by centering Earth just above the plaque. See that little finger-like piece sticking up? We'll go by that. Right now it cuts Earth in half."

"All right. I'll take the first trick."

Of those aboard, only McCarthy possessed a watch that ran, since it was encased in a water-proof jacket. Now he wound it up. George was to take a four-hour shift, then Brett would relieve him, trying to get some sleep in the meantime.

As he slid down the strap Brett found Dell awaiting him. "You've been wonderful," she averred, "If only we could have saved the children, everything would be top-hole."

Brett waved aside her congratulations. "We're not there yet," he pointed out. He was sorry as soon as he had said that, but he needed something to cover up his embarrassment. And Dell understood. She chuckled happily. "Do you know—when we *do* get home, I'm going to start a movement to release every pet in the land!"

"Now I know what it means to a dumb brute thrown in with creatures whose language is not its language, who make their will its will."

"I guess there's a lot in that—not being able to talk back. God knows it's been a horrible enough experience for all of us." He wanted to say more, but he seemed to be going to sleep on his feet. The girl noticed his discomfort, and suggested that he rest. He scarcely knew that he lay down, falling asleep almost as soon as he reached the bare floor. He hadn't had any sleep to mention in the last three or four days. But it seemed almost immediately that they were waking him again. Someone was shaking his shoulder, crying in his ear. "Brett, Brett—wake up. The DECAPODS HAVE CAPTURED US!"

CHAPTER X

SLEEP was immediately banished. Rising to his feet he stared out of the ship's transparent wall, to behold an awesome sight. For there—scarcely a thousand yards away, loomed the great Drum-Ship of the Decapods.

"They're dragging us back to Mars!"

The men were grim-faced, the women in tears. Mattie was moaning and praying at the same time.

A glance told him it was true. Far more swiftly than they had come, the Drum-Ship was dragging them back, away from the sun, away from the Earth, back toward Mars There was no visible grapple, but such a bond existed now between the two ships nevertheless.

In terse words George told what had happened. How, suddenly, the huge ship had come upon them, invisible until it was quite close; then the

sun glinting on its golden sides appraised them of its proximity. But they hadn't realized, at first, that it had them in its grip.

Brett climbed to the controls to see that nothing had been touched, only now the oscillating bar was swinging aimlessly back and forth. For a moment he studied the bank of controls, a row of buttons whose purpose he did not know. He pointed these out to George. "Shall we try them? No telling what they're intended for . . ."

George agreed. "I thought of them, yet was afraid to try them out."

"It can't hurt to try. Death awaits us on Mars. I'm going to try this first green button here. Hold on . . ." And as he spoke he pressed the first of a row of six green buttons that studded the bottom of the control bank.

Breathlessly they waited. Nothing happened!

"Wrong," muttered Brett, and he pressed the second.

"THEY'RE FALLING BEHIND!" went up the cry in the ship.

Looking around Brett saw this was true. It appeared that they were stationary, that the larger ship was rapidly dwindling in size. "Whatever you did," cried George jubilantly, "you've counteracted their power . . ." Then—"Good Lord—here they come back!"

As he cried out the enemy grew larger, racing down upon them.

Brett gave his full attention to the controls, again twisting the three great knobs to the full extent of their thread, then he juggled the "stick," until Earth once more lay directly in their path. Difficult though it was to judge their rate of acceleration, it seemed that their own ship gained on the other, the growth of the pursuer being less rapid than before. Still it was evident that the Drum-Ship pos-

sessed a greater speed, eating up the short advantage they had gained almost immediately.

"Well," he said somberly. "I guess there's nothing else to do but try the rest of the buttons. Here goes."

As he spoke he depressed the third button! A cry of astonishment went up in the ship. They could no longer see outside; they were enveloped in a hazy aura that enclosed the entire machine. And the next instant the whole ship rocked, seemed to tilt—then righted itself.

THEY waited, and again there came a rocking that ceased after a few moments. When the third rocking came and passed, Brett cried out: "They're firing upon us from the big ship . . ."

As if to prove his words their ship rocked again. After that, however, it did not come again, though five, ten minutes passed.

"Think they've given up?"

"Maybe, but I don't like this fog around us. Wonder what the next button will do?"

"Try it," ordered George.

This time the haze faded away; again they could see the Void wherein the Drum-Ship loomed like a great evil eye a thousand yards behind.

"LOOK OUT! THEY'RE GOING TO FIRE AGAIN!"

Brett had seen the pencil of light leave the ship's side even as George yelled, and at the same time he punched the third button again. Immediately they were reenveloped in the haze that was like a shining white fog. The rocking was heavier than before, tossing the machine around like a cork.

"I've got it! This haze is a power screen to protect us from their rays.

Wonder if this ship's got one of those rays?"

"THE FIFTH BUTTON!" declared George.

Brett nodded. "Yeah—but how do we use it?"

"Their ray seems to come directly from the front of their ship—perhaps, if we turned around . . .?"

Brett lost no time in acting on the suggestion, shoving the oscillating stick about. They could feel no movement, but when he had the stick pointing at right-angles to its former position he depressed the button that dissolved the power screen, keeping a finger close to the accompanying button in case the Drum-Ship had the march on them.

It lay in the same position as before, its very presence a menace, but Brett found that their ship was somewhat off center. Again he moved the "stick," bringing the control panel in direct line with the big ship.

Then, his hand went to the fifth button on the panel before him. And at the same time the Drum-Ship struck.

A cry went up from the watchers. Some covered their faces with their hands, others stared, grim-faced, waiting . . .

The two rays had met. Almost in dead center between the ships. There was a terrific flash of lurid, evil light, though no sound came to them in that soundless void. Brett did not wait as he flashed on their power screen once again.

He waited a reasonable time before lifting the screen. George was ready to depress the beam button, so that almost simultaneously, with the flashing out of the screen, the pencil ray cut the blackness.

A shout went up in the little ship

as the long light-beam impinged itself upon the shell of the decapods' ship, but Brett did not wait to learn the result, hiding their ship immediately within their protective cloud. He let five minutes go before he dared look out.

The big ship was still there, its distance greater, however, although it was unscathed, wrapped now in a dense brilliant cloud that sparkled like diamond facets in the sun's rays that it had imprisoned.

Disappointment filled the hearts of the Earthlings as Brett again reenvveloped them in their own screen. "There's nothing to be done," he admitted, "but to go on. As long as we have the screen we're safe, and *vice-versa*. We'll turn about and try to head for home . . ."

As he spoke he pressed the "stick" back to its original position, releasing the screen long enough to center the focus of the ship on the green half-moon that was "home." A glance backward showed that the enemy was still clothed in its fog.

HE ordered George to get some rest, suggesting that it was time for the serving of some food. Jerry had pilfered a half a dozen scoops, the only ones within reach when they raided the dining hall, and the Earthlings lined up for their rations. When they had all eaten sparingly, those who could bring themselves to compose their minds for sleep, did so, disposing themselves as best they could on the bare floor. The women gathered in the adjoining room for what little privacy it offered them with only a transparent wall between.

Brett slid down his strap to the floor. Forrest came to his side. "Gee, Mr. Rand, you were great. You know this is just like the stories I read,

only I wish you could have 'gotten' that ole ship out there. . . ."

"I wish so too, but it looks like stale-mate for the present. No use risking ourselves. Later, perhaps, they'll grow careless."

He looked around for Dell, and saw her in the other room bending over one of the women. Walking to the small machines in the center of the ship he studied them speculatively. From them came the soft throb that filled the air, yet he could see no moving parts. Then, for the first time he noticed a feature he had not seen before.

In the floor was a circular disk, about four feet in diameter. In its center was a smaller disk set below the floor's level. Hesitantly he reached out a hand to touch it. And at his touch the whole piece of the larger disk moved aside, revealing a circular chamber about a foot deep. On its floor was a second knob like the one on the plate above.

"I wonder," he said aloud, and looked for something detachable upon his person. A button on his sleeve filled his want, and he tugged until it came free. Laying it on the lower disk, he closed the upper one and waited, but nothing happened. Through the transparent metal he could see the button lying as he had placed it.

"Must be some sort of control . . ." he muttered. "Ah—here it is . . ." He had discovered a tiny lever, scarcely an inch long imbedded in the knob, and he shoved it over with his thumb. Staring through the top disk he saw the floor beneath fall away, revealing the emptiness of Space. The button slid off the disk, and then the contraption closed automatically with a snap.

"An air-lock!" he mused, "Gosh, had I found that before, I'd have known for certain this ship was air-

tight. A nice little arrangement to throw away trash . . ."

Several hours later he climbed to the control panel. Releasing the fog screen a minute he verified their course, replacing the screen again. A single glance behind revealed the decapods' ship still wrapped in its protective shroud of glistening light. Then his eye fell upon the sixth button of the series that had proven so providential. What, he wondered, would that button do?

After a moment's hesitation he decided to risk it, and pressed the key. To his surprise a small circular portion of the panel slid to one side revealing a smooth polished surface on which dots of light shone. A startled glance showed him a greenish half-moon held in dead-center of the disk. He almost shouted with joy! No longer need he switch off their power screen to determine their position, for this was no less than a vision-screen. They no longer were flying blind!

CHAPTER XI

HOURS slipped by. George awakened, and most of the others roused themselves. They dined again, and George took his place before the controls. Brett suggested now that they give the women more privacy than they had. He had noticed a number of hooks stuck in the partitioning wall, and decided that a screen could be provided if each man relinquish either his suit coat or outer-shirt. It was warm in the ship, and they would not need them. Mrs. White-Smythe contributed her suit coat, and Mrs. Burton had a silk jacket, so that a sizable curtain could be hung by means of one of the "dog-leashes" across the wall.

"Now, if we had some water, we

could make ourselves half-way presentable," observed Dell looking at her unwashed hands.

"We've got water," declared Forrest. "One of those tubs is full. Shake it, and you can hear it gurgle . . ."

A rush was made toward the cask he designated. The top was pried off (a small handle was provided on each tub for that purpose) and sure enough water was found within.

Brett considered. Their food precluded the need of drinking water, yet the very sight of it made him thirsty. He saw several people running a tongue over their lips. They would all enjoy a cooling drink. But he shook his head. He feared that once they started on the water, they would want more and more, and one barrel would not last long. Yet, they'd all feel better if they could lave their dry skins. He explained all this, but there was only one dissenter. It was Congressman Howell.

"Since when are you giving orders, Mr. Rand?" he wanted to know. "I don't recall any election of officers for this cruise . . ."

Brett looked up in surprise. There had been no selection of officers, and actually there seemed no need. He had simply taken the lead up to this point, because it seemed the only natural thing to do, especially since no one else had demanded the job.

A deep silence followed Howell's words. Brett started to answer. "You're right, of course, I . . ."

But he got no further. It was the Militant Matron who spoke up. "I think Mr. Rand's done an excellent job of it so far, Congressman, and if there's any point in electing him—I, for one, cast my vote for him. Without him, we'd still be back there—on Mars," (So she admitted the truth now). "He's been the only man here

with guts—yes, I said guts—to rescue us, and I think he should be our captain. How 'bout it, folks?"

She turned to the others, and her response was a cheer from all sides. Disgruntled Howell slipped away.

Taking turns with the five food scoops (the sixth was used as a ladle) each man and woman received their water ration. They could do no more than wet their faces and hands with it. However, one of the women had the brilliant idea of dumping all their water into the airlock receptacle in their room (a second lock had since been found in that chamber) and using the combined water to wash out such clothing as they could manage.

Brett in the meantime ran his hand through his straggly beard as he waited his water ration, wishing for a razor to remove it. But he knew, or thought there wasn't one in the crowd; that is until Forrest sidled over to him.

"Want a razor, Mr. Rand?"

Brett looked up and grinned.

"I got one," admitted the boy in a whisper as he ran a hand over his virgin chin. "Some older fellows were kidding me 'bout not shaving yet—back home, you know. So the day the decapods came—I had bought a razor. I—I thought I'd shave and make the hair grow.

"I never said anything about it before, 'cause I thought I'd get laughed at, but if you told 'em I bought it for my dad . . ."

The man could have hugged him. The razor, an ordinary safety affair was rusted, but he did not care. He almost shouted when Forrest brought out a tube of shaving cream that all this while had reposed in his pocket.

The others crowded around, begging for next go. Forrest insisted his

hero have the first shave, the others, he said with a negligent wave of his hand, could draw straws for it—or something.

The backing of the power screen made a dim mirror of the ship's walls, and Brett used that for his shave. After some difficulty in hacking away the hirsute growth, and nicking himself more than once he managed a fairly clean shave. Then he relinquished the razor to the next in turn. Luckily, the boy had likewise purchased a package of blades. Each man kept his blade for further use.

Dell made her appearance with the other women. "I feel like a new woman," she laughed, "One could scarcely believe that a little water could work such wonders . . ."

The effect of their ablutions was to give the Earthlings a new lease on life, an uplift in their morale. Their eyes had brightened, and their cheery voices filled the ship.

When it came his turn at the controls Brett again threw off the power screen to ascertain if the decapods were still on their trail. No sooner was the screen replaced than a rocking shook the ship. The decapods were most assuredly on their tail.

He conferred with George. Should they again attempt to rid themselves of the enemy? They decided to consult the others on the momentous question. The majority vote was for War!

ONCE more the ship was swung out of its course, turned about so it could face the enemy, and Brett worked until the big ship lay centered in the vision screen. Then with one finger he depressed the button that released their own screen, while almost immediately, he switched it on again. There followed a rocking of the ship as a pencil beam from the de-

capods' machine flashed across the Void.

Twice he used the same tactics, and twice the other struck; but the third time the decapods resorted to the same strategy, dropping their own screen. Instantly Brett shot out his ray. It worked.

"A HIT! A Hit!" cried George, and they saw the big ship stagger, side-slip and try to right itself. Only it could not. It was careening wildly, from side to side. But the decapods were not done yet. A white beam cut the blackness, but the ray was wild, and did not come anywhere near their ship.

Twice the decapods attempted to restore their protective screen, and though it flashed on each time, it faded almost instantly. Again Brett used his ray upon it, but now the other was quickly dwindling in size and the range was too great.

For several minutes they followed it, but hurt though it was, the big ship could accelerate more quickly, and was swiftly moving away—back in the direction from which it had come—back to Mars . . .

Breathing a sigh of relief the pilot turned about, heading for Earth once again. Earth was still far, far away, and there was no way of computing how long the voyage would be.

With no further interruptions the monotony of space began to tell upon the travelers, voices grew low, eyes lack-luster, bodies listless with nothing to occupy mind or body. They commenced to hate the sight of food, most of them suffering from cramps as well as from the colds they had brought from Mars.

Brett commenced to wonder if they *should* reach home alive. He realized he was feeling pretty rotten himself, only the excitement of the escape and

the fight with the decapods had taken his mind from it, but now that he had time to allow himself to dwell upon his condition, he knew that he was actually sick.

Endless hours slipped by, and with them the sickness aboard grew apace. Clarice and Mrs. Burton were very sick, staying in the other room, not even coming out at meal time. Mattie who had taken to prayers again, calling upon God as witness to their sins, sometimes forgot to pray as she moaned instead. Miss Snowden sat slumped in a corner most of the time, and the Militant Matron, though she tried to help Dell cheer the others, was visibly sick. Several men were in the same condition, refusing food, and Forrest's eyes were over-bright.

Swung in the seat woven from the overhead straps facing the control panel or lying in his corner Brett found that there were long lapses of time in which his mind seemed away from his body. His body grew to be something unattached, his lucid moments becoming fewer and fewer. Sometimes he thought he was on Mars, sometimes at his desk in the Bureau of Standards back home. Sometimes he heard himself talking aloud, to no one in particular.

"It's the food," he heard Dell mutter to George one time. "It's rotting . . ."

That woke him up. He hurried to the open tub they were using, three of the others were empty. He tasted it, and only with effort kept from retching. It was rotted.

He called George. "Let's open the last barrel." It too was rotting. "No more food," he said.

The next meal time, only water was doled out from the now half-empty barrel. No one seemed to notice the

change, nor care. Brett crawled up to the control board to check the course. The green mantled Earth lay in dead center of the screen, but it still seemed far away. He grew panicky. Perhaps they no longer moved!

CHAPTER XII

FOR a long time he stared at that far away globe. For a time he forgot what it actually was; it had revolved into a symbol, a symbol of attainment, but outside that he could not remember. It seemed that the Void had always been, all that he had ever known. Only he could not put out of his mind that deep longing he felt for that greenish half-globe with its diminutive moon alongside, for Luna had since detached itself slightly from the side of Earth and rode the darkness, shedding its light on the mother planet.

Once some one aroused him to tell him that Clarice was dead, and Mattie was fast sinking, but the words scarcely meant anything. He knew that Kent had already passed away, and that several others were in a deep coma from which they could not be aroused.

The next time his brain roused itself he became aware of a distinctly unpleasant odor around him. He puzzled over it a while before he realized that it came from their fouled food supply. Something snapped within him, and he was more fully alert than he had been for some time. He realized the need of ridding the ship of the stuff. Before this, he had puzzled about their air-supply, afraid that that might also give out on them, but he had come to know that one of the ship's two motors was designed to keep it clean and pure. Only with that putrefaction rising from the tubs, the

air would soon grow stale. They had to be emptied.

Glancing about for help he saw George sleeping, making vague stirrings that bespoke a troubled body. Moore, the merchant, lay supine, snoring spasmodically, the little rolls of fat gone from his face, his skin an unhealthy yellow. Howell lay in a strange unnatural position. Leaning over him Brett realized he was dead. The mulatto, Harris, was doubled in a knot, sweat streaking from his face. Jeff the big Negro and Jerry the reporter seemed the only two that looked normal. Forrest was breathing with difficulty, and McCarthy lay with an arm around the dog, mumbling in a delirium. Shaking Jeff and Jerry away Brett told them what had to be done. None of them were strong enough for the task, but together they managed to push the pair of casks to the air-lock, tip them over so their contents spilled into the small receptacle. When it filled up, they closed and dumped it. This procedure had to be repeated many times, the three of them suffering time and time again over their ugly task as the evil smell of the mass affected them. They were forced to scoop out the bottoms, but at last it was finished, the casks tightly closed.

THE dead presented another problem, but they did not like the thought of consigning them to space. Dragging the bodies to one side they covered them with a few coats taken from the screen shielding the women.

On, on drifted the ship of death, moving slowly toward its objective. From his place on the floor Brett raised his eyes from time to time to the body of George slumped within the straps above his head, eyes closed. But those facts scarcely registered

upon his brain as he drifted again into the unreal realm of a deathlike sleep. Several times he sought to drag himself out of his lethargy, but each time the effort was too great. He did not know that like a sleep-walker he had gotten up a number of times to wander among the others, putting a hand to a forehead here and there. When next he awoke, he found his arms wrapped around a thin though warm body.

Focusing eyes with some difficulty he found that it was Dell Wayne who lay within his grasp. He was startled by her appearance, her sunken cheeks, the depths of her eye sockets. He grew frightened, fearing that she was dead, and laid his head upon her heart. It beat. The movement awakened her. Somehow she managed a smile. "Brett—good Brett," she murmured in a scarcely audible voice. "I—I guess this is the end—isn't it? It's been nice knowing you—Brett . . ."

The import of her words fell upon him, and suddenly he knew he did not want to die. "NO—No . . . we shan't die—we can't. We've come too far together for that—I can't let you die—you understand? Why, Dell—I love you—I love you. We can't die—yet . . ."

She did not answer, smiling at him instead, an enigmatical smile. Then, they both were silent, drifting again into that half-way death of sleep.

The first shout did not rouse them, nor the second. It took a heavy shaking on the part of the boy, Forrest, to awaken them. "Earth—" he was shrieking . . . "Earth—in our path. Can't you understand? We're almost—home—HOME!"

The last word did it. Brett woke, staring wildly into the wilder eyes of the boy. "Home?" he asked querulously, "HOME?"

Then he was struggling to his feet, dragging Dell with him. He glanced out the ship's side (the power screen had long since been down, after they had ascertained that the decapod ship was really gone). It was true. Before them, filling most of their sky, loomed the broad green globe of Earth. To one side shone a thin sliver of the moon. They were already within Luna's orbit.

Weak though he was Brett managed to climb up to the control panel, staring with yearning eyes at the great body before him, picking out the familiar features of the continent as the globe was turning slowly, half in darkness, half in light.

How long he hung there in the straps, he did not know. Below him he could hear the stirrings of his fellows, almost all aroused now by Forrest. He knew it must have taken hours, that slow approach to the globe, but it did not matter, nothing mattered as the lineaments of Earth grew before his eyes, sometimes blotting by that line of darkness. Gradually it lost its globular form, horizons straightened out, and with a suddenness that startled him, he found that the sky around them was no longer dead black—that it was taking on color—pale blue at first, then deeper and deeper. They were well within the atmosphere blanket!

Now it seemed they were falling, falling too swiftly as land and water rushed up to meet them. "Do something, do something," his brain commanded, "do something before we crash."

The knobs—three of them must be turned. With both hands he tugged and pulled; then someone was helping him, and he found it was George. The ship leveled off, and now the same speed that had seemed so incredibly

slow out in space swung them rapidly through the air, five miles or so above the landscape. Again the acceleration was lessened and Brett jiggled the "stick." They had reached Earth at its most southern point, and he turned the ship northward.

Those who had the power to do so had risen to their feet, crowding to the walls to stare hungrily at the twilighted land beneath. Night came upon them, and still they moved on, on. Brett knew when they crossed the equator by the constellations; steered his course by the pole-star. Dawn was breaking when he realized they lay off the Virginian coast. There was that great arm of land that was the eastern shore of Chesapeake Bay. He headed the ship over the bay, followed it, trying to name the rivers emptying into it.

He found the river he sought, the lordly Potomac and followed its course. Soon they saw the beautiful pattern that was Washington, the tiny sliver of stone that was the Monument. A few minutes later the ship hovered above Haines Point, and Brett halted the oscillating stick.

Instantly the ship nosed down, dropping evenly to the ground, forward motion halted. As the land came up to meet them, George and he twisted the three dials to neutral. The journey was at end.

Like a feather the ship settled upon the grass of the municipal golf-links, not far from the spot, where, on that memorial day, five weeks since, the great Drum-Ship of the decapods had rested.

Again Washington had witnessed the early morning arrival, but there were only police, and soldiers to receive the travelers. Bolling Field and the Naval Airdrome had dispatched planes to the scene, machine-guns pointed downward menacingly. A shout of wonder greeted the first of the emaciated passengers to disembark. Willing hands helped them, while those unable to walk were carried out tenderly.

A week later Brett Rand with an arm around his wife received the news-reporters in his brother's home. Still thin and wan from their experience the pair expressed their joy of being "home."

"I'm going to make a life work of freeing every animal pet in the land!" declared Mrs. Rand when asked if she was going to follow a "career."

"After our honeymoon," Brett said, "George and I are going to study the decapod ship. They are great things to be learned there, mechanisms entirely new to science . . ."

"And that, boys, is one tall order!" It was George, speaking from the shadows.

THE END

The Outpost on Ceres

By L. A. ESHBACH

Ceres is one of those numerous little planets, properly called planetoids, which are confined in their motions to what may be called an orbit of their own. Here we have a story of adventure and sacrifice of the heroic order.

LARRY DAMORE and the Outpost on Ceres—in the annals of the Earth, Venus, and Mars Transportation Lines, Inc., the two are inseparable. No one ever mentions one without referring to the other. Queer what it takes to make—or break—a man. For Larry Damore it took that ugly wilderness of barren, sun-parched rocks—Ceres, the largest of the asteroids. That, and the wreck of the space ship *Helios*.

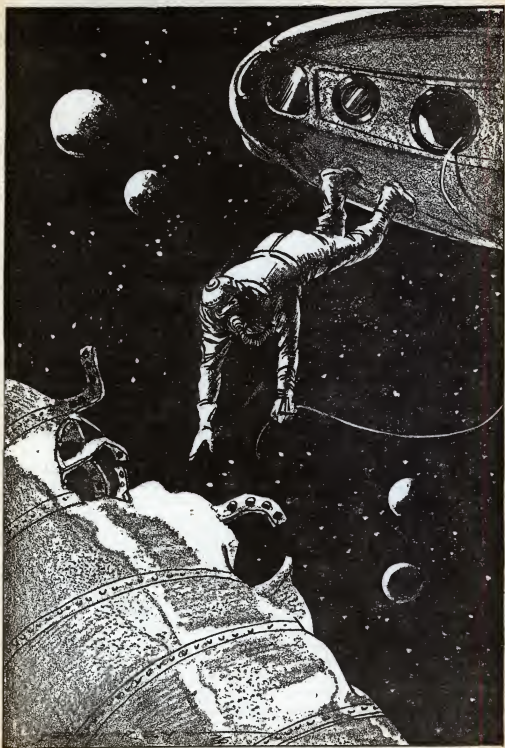
This is Larry's story, but it begins with H. C. MacDonald, President of the E. V. & M. Lines. In those early days of interplanetary travel, when the E. V. & M. cruisers were the only commercial crafts in space, H. C. MacDonald was laying the foundation for the complex transport chain which now unites every inhabited sphere in the Solar System. Contacts had just been made with the people of Ganymede, the third moon of Jupiter. A freighter with a cargo of produce from the three planets had visited the satellite on a trading expedition that had been profitable for all involved—or almost all, for there was one exception.

Approximately 150 million miles from Ganymede, on the homeward journey, the freighter ran out of fuel and drifted powerless through space. No lives were lost, no suffering or hardship was caused by the delay—

but the E. V. & M. Lines lost money on the trip. They had to outfit another cruiser and send it from Mars to the stranded vessel to tow it in. All of which cost money.

When H. C. MacDonald saw the financial figures of the trip go in the red, he shook his shock of bristling, iron-gray hair impatiently. This wouldn't do! True—it was the first time a freighter had attempted a round trip across the 340 million miles of space between Mars and Ganymede, so he'd have to make allowances. But it couldn't happen again! He issued orders to that effect.

An emergency refueling station between the two globes was the obvious solution, so the astro-technicians said—and the asteroids provided a means to that end. Of the fourteen hundred bodies then known, only Ceres, Pallas, Vesta, and Juno were large enough to be feasible. For various reasons the latter three were rejected—though little enough was known about any of them—and Ceres, because it was the largest, and because its orbit was comparatively close to the half-way mark, became the unanimous choice. Work was begun immediately to fit the little, airless sphere for its lone inhabitant, the guard of the refueling station—and the Outpost on Ceres became an actuality.



Then placing his feet against the side of the space flier, his head pointing towards the "Helios," the end of the unwound cable held in one hand, he kicked vigorously.

When H. C. MacDonald sought for the man to become the first guard, Larry Damore was one of the few applicants for the job. The life on the asteroid was obviously one of the loneliest in the Solar System, and few men were willing to isolate themselves so completely—particularly young, educated men, the type H. C. MacDonald wanted. Larry was really the only applicant suited for the position—and he got it.

At his first sight of Larry Damore, interest lit up H. C. MacDonald's eyes. Tall, lean, with a long, dark face, high cheek bones, and deep-set, gray eyes, Larry couldn't have been called handsome. Nor was there anything very striking about him, unless it was his diffidence, his perpetual, half-apologetic self-effacement—a trait that seemed entirely out of harmony with his general appearance. Despite that, however, there was something magnetic about him, something that seized and retained the interest of an observer. It wasn't his face . . . rather, it seemed to be something *behind* his face, a lurking fear, a deep-lying hurt that couldn't be entirely suppressed. It was that more than anything else, probably, that prompted H. C. MacDonald to hear Larry's story—and to send him to Ceres.

Summed up, Larry Damore's tale—and the tragedy of his life—could be told in a sentence. He was a drug addict—a dope fighter. There was more to it than that, of course; and H. C. MacDonald heard it all. Larry told it simply, frankly, and without any attempt at self-justification.

His first year out of college; an excellent position in a big observatory, following the study closest to his heart—astronomy. Then had come the crash in a passenger plane, and the injury to his spine. It wasn't incur-

able, but it had taken time—and the pain was incessant. They had used morphine to enable him to bear it. When he had recovered, had left the hospital, the morphine habit had persisted.

He had taken a cure but it had done no good. A second attempt had failed as dismally. Finally, he had gone north into the white wilderness of ice and snow where the drug could not be gotten—had fought his way to freedom.

A slip on the ice—a broken leg—a doctor who had administered morphine—and Larry Damore was back at the bottom. Now, applying for a job in the lonely emptiness of interplanetary space, he was making one more attempt to regain his manhood.

Despite his gruff exterior, H. C. MacDonald had a heart as big as his own great body; and when Larry Damore finished his low-voiced story, he gazed at him in tight-lipped silence, a strange light in his squinting eyes. Then his big hand gripped Larry's shoulder.

"Lad," he said quietly, "the job's yours. An' I hope—I *hope*—you'll pull through!"

THREE months on Ceres! Larry Damore laughed shortly. Three months, as time was reckoned on earth, he had been alone on this barren little world. Three months of—hell!

First, the struggle with his desire for a narcotic. He could smile at it now, a little grimly, perhaps, but it hadn't been amusing; no! His features stiffened as he thought of the hell-fire of desire like the concentrated thirst of a Sahara that had tortured every inch of him. But that was past now, the drug-craze subjugated—at least for the present.

Loneliness had followed—the burden of utter solitude. He was alone on an airless mass of rock where there was no movement save his movements, no sounds but those that he brought into being—and the latter only within the two rooms of his air-tight, air-charged metal dwelling. Loneliness . . . he had never before realized the meaning of the word. But he knew now; knew what it meant to be startled by the sound of his own voice suddenly breaking the dead silence; knew the horror of a solitude that caused him to raise fevered eyes and hands to an unresponsive expanse of star-flecked blackness and plead for the sound of another human voice.

The drug had undermined his brain and body; weakness had made his isolation the more terrifying.

To occupy his thoughts during the first two months, he had explored the entire surface of the asteroid, removing some of the ballast from the feet of his space-suit, and bounding over the jagged world in tremendous soaring leaps. He had spent countless hours in inspecting the huge, squat, drum-shaped tank that held the compressed fuel-gases, familiarizing himself with every detail of its construction. He had sat for endless days before the ultra-short wave visaphone, listening for voices out in space—voices that did not come. He had read and reread books; he had tried to write a record of his excursions about the asteroid. But all had palled after a time.

Only his interest in astronomy had remained constant. During each of the short but frequent Ceresian nights he spent some time in the open beneath his portable refracting telescope, studying the heavens under conditions that were ideal. Observation was excellent even during the

day, but he preferred the utter blackness of night.

This interest, he believed, had saved his sanity during those early weeks; now the suffering from his loneliness, like the drug habit, was largely a thing of the past. Three months without morphine had freed his body of its blight—forever, he hoped. His reactions to his environment had become those of a normal human being. His craving for companionship was no longer a mania.

Abruptly, with a half-impatient shake of his head, Larry rose to his feet. He had to guard against those ever-recurring thoughts of his solitude; they could make his lonely life no easier—and they *would* make it harder. He crossed the room to one of the thick, circular, convex windows—then suddenly whirled, startled.

Clang . . . clang . . . clang! Loud, clamorous, the bell tone rang through the boxlike chamber. A pause; then it came again. *Clang . . . clang . . . clang!* An instant's hesitation, and Larry sprang toward the far wall.

Three notes—the distress signal! A message coming in on the Universal wave-length. He crouched before the powerful visaphone, tense fingers adjusting the instrument, transferring the message from the recording discs to the televisior screen. The rectangle of white glowed momentarily—then the control room of a space cruiser flashed into view.

A stern-faced figure stood stiff-legged in the foreground, despairing eyes staring into Larry's. Behind him a blue-clad pilot struggled with a bank of controls. Larry caught the frantic flow of words in the midst of his plea for aid.

“—rushing through space directly in our path. We've tried to avoid it,

but it's too big—we saw it too late—we haven't a chance. The meteor will strike in a very few moments.

"The passengers are in air-tight compartments in the base of the ship. If we aren't completely smashed, they may escape. Rush a rescue cruiser out here to pick up survivors."

A short pause, then: "Private E. V. & M. cruiser *Helios*, bound from Mars to Callisto on a diplomatic visit. Following space-route 31, passing over asteroid belt. Pilot Banning speaking. We've entered the path of a huge meteor—"

With a single, sweeping motion Larry returned the message to the recording discs and closed the switch that lit up the tubes of a transmitter. His own strained figure and voice flashed through the void on the Universal wave-length.

"Space ship *Helios*—space ship *Helios*! Larry Damore speaking from Outpost on Ceres. Have your message. Am relaying it to Mars. Starting at once for Route 31."

Twice he repeated this, then switched the current back to the television screen. There was no sound save static; and the white rectangle stared blankly. Larry's throat was dry. There was death out there in the silence—sudden death.

Abruptly he spun away from the silent television; faced the transmitter. Adjusting it to the restricted wavelength of the E. V. & M. Lines, he reported the fate of the *Helios*, repeating the message again and again till he was certain it had reached listeners on Mars or earth. Help would come in the fastest ship in space—he was certain of it.

With a final check over the instrument board, Larry cut off all current except that of the emergency recorder and distress bell, and climbed into a

massive space suit. A cross between a diver's suit and armor, it looked intolerably heavy; but in the weak gravitation of Ceres, with only one ten-thousandth of the mass of earth, it was almost weightless.

After testing his air-purifier, he passed through a vacuum chamber and paused an instant on the meteoric dust and jagged rocks of Ceres. Directly before him lay the huge fuel-gas tank, and close beside it, overshadowed by its great bulk, were two small, metal buildings—one, housing the dynamos that generated his electricity; the other, the hangar for his two-passenger cruiser. A single bound carried him across the intervening space; and a minute later he was seated at the control board of his craft.

A high-pitched roar burst from the base of the blunt nosed cylinder, and it tore through the opening in the hangar's roof, out into the blackness. Up it shot at right angles to the plane of the ecliptic, up, until it passed the orbit of even the most eccentric asteroid—above the asteroid belt. Then, studying his space chart, Larry headed toward Space-route 31 at maximum acceleration.

For the moment the controls needed no attention; it gave him a chance to think. He glanced into the gloom at a passing asteroid, and smiled mirthlessly. He had something to do now, something beside killing time. And perhaps he'd have human companions for a while—if any had survived the wreck. . . .

His plans for the night had gone awry. Down there somewhere in the asteroid belt, Vesta, smaller only than Pallas and Ceres, was moving slowly toward the latter. Their orbits would not intersect, but in seventeen hours they would make their closest approach to each other. He had intended

studying the other asteroid, for, viewed from earth, Vesta, 240 miles in diameter, was three times as brilliant as Ceres, though Ceres was twice its size. Ever since its discovery in 1807 Vesta had been a mystery to terrestrial astronomers—and Larry had hoped to solve the enigma of its unnatural brilliancy.

He shrugged. What did it matter? There would be other opportunities. And somewhere before him in the blackness men and women might be drifting helplessly about in a battered derelict waiting for *him*. Vividly he pictured the tragedy of the *Helios*; vividly he saw fellow beings writhing in suffocation. . . . And for an instant he longed for a "shot" of morphine. . . . Then cursed himself for his weakness.

After a time Larry's thoughts struck off on another tangent. The *Helios*. That name seemed familiar. He repeated it aloud, but though that sense of familiarity remained, he could associate it with nothing tangible.

On and on his craft sped, with Larry peering steadily ahead into the starry firmament. Occasionally he would glance at his space-chart and adjust his course to conform with his readings. Skillfully handled charges shot from lateral vents could correct any minute deviation from the route set by the chart. And the latter was practically infallible, for, with delicately balanced pointers that were controlled by variations of the gravitational pull of every body in the System, it could only fail through the faulty human element that entered into its construction.

The flight to Route 31 seemed almost endless to the taut nerves of Larry Damore, though actually it required a little less than four hours.

But he reached it finally, and began the search for the wrecked *Helios*, a wide, powerful beam of white radiance spreading from the nose of his flier.

His discovery of the drifting derelict after a long and futile quest was the result of good fortune rather than design. He had traversed many miles of Space-route 31, moving toward both Mars and Callisto, without catching a glimpse of the *Helios*. Despairing, at last, he had sent his craft careening aimlessly through space—and his beam of light had been reflected from an irregular metal surface far to the right.

Instantly he realized why he had missed the cruiser, and berated himself for his stupidity. The velocity of the meteor had been so great that it had borne the *Helios* along with it for some distance. Momentum had carried it racing in the meteor's wake.

A few minutes of careful maneuvering—and he was beside the wreck, following the same course, and moving with identical speed, coasting with rocket charges cut off.

The *Helios* was in a deplorable state. The fore part had been torn away completely, and the rest of it, except for a small section near the base, had been crushed into a shapeless hulk. Larry surveyed it gloomily. It seemed absurd to imagine that anyone could be alive in that ruin. But he had to be certain—though he dreaded to see the results of sudden death that the *Helios* was sure to reveal.

With an impatient shake of his head he prepared to visit the derelict. Securing a long, coiled steel cable from a supply chest, he let it unwind, then carried it through the airlock into space. Drifting along beside the boat, propelling himself by means of regularly spaced hand grips, he reached

its base, and fastened the cable to a large metal ring put there for that purpose.

Then placing his feet against the side of the space flier, his head pointing toward the *Helios*, the end of the unwound cable held in one hand, he kicked vigorously. In an unwavering line he shot toward the wreck. Almost upon it, he swung on the cable, and with out-thrust feet checked his flight. A moment later he floated through an irregular rift in the walls and set foot on the battered cruiser.

After fastening the cable securely, anchoring the space boats together, he looked around him. Luxurious furniture floated aimlessly about, its motion maintained by occasional collisions with the walls. Amid the wreckage drifted the lifeless body of a tall, frail, pink-skinned Martian. Blood had gushed from his long nose and wide, pendulous ears, and great, ugly ruptures had torn his skin. With the sudden loss of atmospheric pressure, the man had literally burst! Sickened, Larry turned his eyes away.

A wave of weakness swept over him. He glanced back toward the aperture in the wall. It was foolish to waste time in this derelict. They were all dead—must be. He could turn back—His lip curled in derision. Hell of a brave man he was! Savagely he pushed against the wall and floated through a doorway into the next room.

A sudden gasp of surprise and relief escaped him as he glanced across this chamber—a dining salon. Floating toward him were two figures in space suits! And they were alive!

In his excitement Larry called a greeting—then realized its futility, and waved. The approaching figures waved in turn, and a moment later joined him. A gloved hand caught Lar-

ry's and gripped it tensely. A handsome face—*too* handsome, Larry thought—stared into his, and full lips framed the words!

"LORD, but I'm glad to see you! . . . We're alone—the only survivors."

Larry swung his gaze to the other figure; and he was looking at a woman—small, piquant, blonde-haired. Her blue eyes stared from beneath tear-reddened lids, alight with dawning recognition.

"Marcia MacDonald!" Larry exclaimed. She smiled wanly; and her lips said, "Larry." Then pointing to herself and her companion, she indicated that there were none living beside themselves.

Nodding, Larry waved toward the doorway through which he had come. With one accord they propelled themselves into the adjoining room and from there to the outside. Following Larry's example, they drew themselves hand over hand along the steel cable toward the space-flier.

The thoughts of Larry Damore were in a turmoil. Marcia MacDonald out here in space! The irony of it! The daughter of H. C. MacDonald—she must be his daughter, for the *Helios*, he remembered now, was the big boss's private cruiser. And she was the girl he loved, had hoped to marry—before his downfall!

He had met her in college, and had loved her from the first. He had been on the verge of proposing marriage when his accident had occurred—and he had seen her for the last time when she had visited him in the hospital. . . . He couldn't very well ask her to be his wife now, could he? Larry Damore, a dope fighter—and the daughter of H. C. MacDonald! He

grinned bitterly, a rebellious light creeping into his eyes. It would be pleasant to associate with her under the circumstances, pleasant—as hell!

Reaching Larry's craft, the three passed through the airlock into the cramped interior. When the pressure gauge registered "normal," they removed their spherical isol-glass helmets.*

The instant she could talk, Marcia MacDonald cried with some of her characteristic lightness:

"Larry Damore—you—out here in space!"

Larry nodded somberly. "Working for your father, Miss MacDonald. The guard of the emergency refueling station on Ceres."

"Well, it was lucky for us that you were here, for if you hadn't been—" Marcia's attempt at a smile failed dismally.

"Yes, old man," her companion interposed, "you came when we needed you most. Our oxygen supply would have lasted about ten hours longer; then—we'd have gone the way of Darc Plnov and Na Gertswa, our Martian fellow-travellers." The man's expression was cordial enough, but his friendliness seemed somewhat forced. Perhaps, Larry thought, he had not liked the fact that Marcia knew him.

Rather stiffly he answered, "I'm glad I could help you, Mr.—"

"Ray Starke!" Marcia concluded quickly. "Sorry—I should have introduced you two. But I'm afraid I'm not quite myself just now."

Larry smiled deprecatingly and

gazed out through an isol-glass port-hole at the shattered *Helios*. His attitude became suddenly businesslike.

"Are you certain, Miss MacDonald, that there were no other survivors?"

"Absolutely certain," Starke answered for her. "You see, this wasn't an ordinary passenger cruise. It's Mr. MacDonald's private car which we were using for a—a diplomatic trip to Callisto. The Callistonians are a peaceful people, according to the Ganyemedians, so Mr. MacDonald permitted his daughter to represent him. I am the agent for the smaller stockholders; and the two Martians were emissaries from their branch of the company. Venus, of course, had no official representation. Beside the four of us there were only the members of the crew—two pilots, a cook and his roustabout. All of the crew were carried away by the meteor, and the Martians, because they didn't think space suits were necessary, were killed instantly. We're the only ones left."

Larry turned toward the control board. "Such being the case," he said, "I believe we'd better be heading for Ceres. Your father will be worried about you, Miss MacDonald; I want to relieve his mind as quickly as possible."

Leaving the two to make themselves as comfortable as they could in the crowded room, he sent his craft roaring through space, the wreck of the *Helios* trailing after them at the end of the steel cable.

GLOOMILY Larry Damore gazed out through a round isol-glass window into the Ceresian night. His gray eyes shone dully under frowning brows. His mind was troubled, striving to fathom the inexplicable and uselessly cruel caprice of fate which had recalled Marcia MacDonald from

* (Note) Isol-glass, the transparent, glasslike substance used extensively in the construction of space cruisers and space suits, is one of the major achievements of modern chemical science. It is an alloy—if the word may thus be used—of various transparent elements, which, together, isolate and cut off all forms of radiation that are harmful to human life, permitting only the beneficial rays to pass through it. Malleable and extraordinarily tough.

A.M.S.

the mists of memory to torture him with vain longings.

They were asleep now, the girl occupying his bed in the other room, and Ray Starke stretched out on a pneumatic couch in a near by corner. He could hear their soft, regular breathing. His own couch remained untouched. There would be no sleep for him this night; his thoughts were a horde of mocking devils that gave him no rest.

Lord—what he'd give for a shot of dope to quiet his nerves! He licked his lips—then suddenly clamped his jaws together, silently cursing himself for his craving. Dope be damned! . . . Then he shook his head. No sense in letting himself go. Eventually calmness returned.

Queer, he thought, how events were interwoven in the vast loom of life. On one hand, his wish to overcome the drug habit, and his assignment to this lonely outpost. On the other, the whim that had prompted an adventure-loving girl to persuade her father to make a place for her in a diplomatic interplanetary voyage—where she certainly did not belong. That, and a massive meteor hurtling through space for incalculable ages, to strike a space ship at a certain point in its flight. Queer!

Suddenly Larry's lips twisted wryly. There had been nothing "queer" about his recent conversation with Marcia. That had been agony.

Upon reaching his metal home several hours earlier, he had reported to his superiors the rescue of Marcia and her companion. Then, while the three of them had talked, he had prepared a hasty meal for his guests. At its conclusion, Marcia, with characteristic abruptness, had announced that she wished to speak with Larry alone—"to talk over old times." Taking the

hint, but with poor grace, Starke had decided to do a little exploring before darkness fell, and had left them.

Marcia had gone directly to the thought that had been troubling her. Larry remembered her words:

"Larry Damore, you're not yourself! You're too quiet, too reserved. What's wrong?"

Then he had told her his story, omitting nothing.

"I'm here now," he had concluded. "thousands of miles from drugs. I can't go back—and even if I could, I wouldn't have the courage. Here I can fight against the craving with half a chance of winning. On earth something might happen—the dope—and I don't think I'd have enough will power left to take myself away from the stuff again. I know I'm a coward—but I can't help it."

"Oh, Larry—I'm sorry, so sorry," she had whispered.

He had looked into her eyes, had seen a world of pity there—but he hadn't wanted pity—didn't want it now! He had been glad when Starke had returned.

Spineless, she must think him—and she was justified. He ground his teeth savagely. He hadn't asked for the drug in the first place, had he? It—it was hell! Memories of past happiness with Marcia tortured him—for he loved the girl.

With unseeing eyes Larry stared out into the nocturnal gloom. Then slowly his mind began to record the things he saw. A vast ebony dome, the setting for a spangled splendor of gleaming gems. No; they were eyes, some huge, round, owlish—the neighboring asteroids; others narrowed, mere pin-points of light—the distant stars.

One of those globes was Vesta, the most enigmatic of the asteroids; it

must be that glittering, silvery orb to the left—the impressive and most brilliant body in the heavens. Idly Larry studied the sphere, an idea fixing itself in his brain. Suddenly he decided. More than an hour of darkness remained; he couldn't sleep; so he'd spend that hour beneath his telescope studying Vesta at close range.

Stealthily he secured his space suit, and got into it without disturbing the sleepers. As soundlessly he opened the air-lock, passed through it into the Ceresian night.

His telescope was stored in the space-boat hangar; lighting his way with an electric torch, he crossed the broken terrain. Reaching the hangar, he carried the telescope, already set on its tripod, to a huge, flat-topped rock, and trained it on Vesta. Then he seated himself on a small stone beneath the instrument and peered through the eyepiece.

An instant he stared, uncomprehending; then his eyes grew wide and fixed in frozen astonishment. Little wonder that Vesta shone with thrice the brilliance of any other asteroid; little wonder that no one had explained the cause of that brilliance. For Vesta was encased in a sheathing of mail!

A huge ball of silvery white, she hung in the sky, casting back the rays of the sun in a blinding torrent. Like some gigantic, spherical space ship, she seemed to Larry, with her highly polished surface dotted with small, circular apertures. Apertures too regularly spaced to be the result of anything but intelligent planning.

With his mind a chaotic jumble, Larry studied the unnatural sphere. What was the reason for the coating of metal? What manner of beings had created it? Suddenly he blinked, then gazed steadily through the eyepiece.

Something, a drifting cloud of silvery mist, seemed to be flowing from the round openings, to drift and eddy and swirl about the little world. Steadily the cloud grew, obscuring portions of the metal surface. Now it began to move away from Vesta; and with its motion, it became more tenuous, more difficult to see. Finally Larry lost it among the stars.

For the remainder of the short night he kept his gaze fixed on Vesta, but it remained unchanged.

Dawn, sweeping over the low, airless Ceresian mountains in a single burst of glory, cut short his observations. Rising, he sprang across the rocks to his home. Noisily he passed through the air-lock and burst into the room, forgetting that his guests would still be sleeping.

Ray Starke snapped erect, startled. "What happened?" he demanded, blinking sleepily.

From the other room came sounds of uneasy motion.

Larry grinned. "Sorry I disturbed you. But I've just seen something that to me—or any other astronomer—is about the biggest thing that ever happened." Rapidly he told what he had discovered.

"All very interesting," Starke commented stiffly, "but I don't think it's important enough to warrant your waking me." He glanced through a window. "Since it's daylight I suppose I might as well get dressed." He slipped into the few outer garments he had removed for the night.

Larry shrugged. "I've already apologized; I'm afraid I can't do any more."

At that moment Marcia's voice came through the partition. "May I come out?"

Larry and Starke answered in unison; and the girl joined them, the ner-

vous horror gone from her face. She was smiling disapprovingly.

"There seems to be some disagreement between you two," she chided. "It just isn't being done, you know. What did you see, Larry?"

Eagerly Larry described his discovery. As he talked he saw Marcia's face light up with wondering interest.

"I want to see that!" she exclaimed. "Don't you, Ray?"

"Oh, yes; of course," he answered without attempting to conceal his boredom.

"Is it still visible, Larry? Can I see it now?"

Larry nodded; and Marcia immediately began putting on her space suit. With studied indifference Starke followed her example. Ready, the three passed into the open.

Suddenly Marcia pointed upward questioningly. Larry's eyes followed the direction of her gaze, and he stopped short, an unaccountable stab of anxiety prodding him.

High above was that cloud of silvery mist that had come from Vesta two hours earlier. But now it was no cloud; it had become a swarm of small, metallic bodies that reflected the sunlight in a white shimmer. A swarm that drew steadily closer.

An instant Larry watched the shifting mass; then he motioned Marcia and Starke back into the boxlike building. About to object, Marcia met Larry's eyes, and she followed Starke without remonstrance. As they passed from sight, Larry sprang to his telescope and pointed it toward the metallic horde.

God! The word was more of a prayer than a curse. What were these things? Thousands upon thousands of slender metal tubes about a half-inch in diameter and three or four inches in length were flashing toward Ceres!

Each end tapered to a needle-sharp tip—a swarm of double-pointed projectiles. Could these be the intelligences that had given Vesta her metal cloak? Or were the cylinders but the vehicles that bore the inhabitants of the asteroid? The latter was probably the truth.*

STEADILY larger grew the swarm, passing beyond the field of the telescope. Were they friendly or hostile? If hostile, they were drawing too close for safety. Straightening, he glanced upward—and with a startled cry sprang for shelter. The things were darting all around him!

He was beset by a horde of them, a deafening fusillade rattling against his space suit. With flailing arms he beat them off, but they returned with increased fury. He was staggering drunkenly when he reached the door of the airlock; his head was ringing—and through it struggled a thought of thankfulness for the strength of his isol-glass helmet.

The door swung open, and Marcia and Ray Starke stood in the doorway. Twin streams of flame shot from their rocket pistols, spraying back and forth through the ranks of the silvery tubes. Like wax they burned under the blasts; in an instant the main body of the things darted out of range. As Larry stumbled into the airlock his companions ceased firing, and flung shut the door.

As the three removed their helmets, Larry smiled grimly. "One good turn deserves another . . . Thanks."

* (Note) Later investigation revealed that the little cylinders were the space-flying vessels of Vesta, each outfitted with a crew of six, minute, intelligent, worm-like creatures. These beings lived beneath the surface of the asteroid; they had hollowed out long, winding tunnels within the solid rock; had built strange cities within which to dwell. Using an alloy of aluminum, abundant in their world, they had constructed the metal roof to prevent the escape of the rarefied air they manufactured. This permitted the growth of the plant life upon which the worm things lived.

Neither Starke nor Marcia answered. They were listening to the ceaseless rain of impacts like a furious hail storm battering the roof and sides of the building. Rapidly it mounted to a steady roar. The girl crossed to one of the windows, and her face paled as she saw the thousands of tiny projectiles. Facing Larry, she raised her voice above the din.

"How long will the wall keep them out? It can't last very long, can it?"

There was grave concern on Larry's face. The roar came from a single section of the wall now.

"Not very long, Marcia. For some reason they want to get in here—and I don't know how we can stop them."

Starke looked at the pistol he was holding. "We can give them some opposition with this; the little devils can't stand the heat."

"Too many of them," Larry said curtly, shaking his head.

For silent moments they looked into each other's faces. What could they do? Starke stared fearfully through a window. Marcia watched Larry who was deep in thought. She saw his expression change subtly. Something indefinable appeared on his face. Suddenly he spoke, his voice almost casual.

"I have a plan that should work. I've considered it from all angles, and it seems fool-proof. The space-car is the only way out. But if we'd just run for it, the little imps might puncture our suits before we made it. And if we'd get into it safely we'd probably be followed out into space, and have the boat disabled there—since the things seem to be just as fast as a space ship.

"As I see it, there's only one way for you, Marcia, and Starke to escape. I'll go out first and start running away from the buildings. When our

little friends follow me—I'm sure they will—and we're out of sight, you two rush for the space ship and head toward Mars. You can operate the boat, Marcia. Perhaps I can double back and get into the shack again, and make a stand against the things."

Marcia's heart leaped. So this was the self-styled coward, the weakling drug-addict who feared to go back to Earth! But every atom of her cried out against his making the sacrifice.

"No!" she objected emphatically, "I won't stand for that. It wouldn't be fair. You—you'd be committing suicide while we ran like cowards!"

With an effort Larry ignored her; addressed Starke. "It's the only way to save Miss MacDonald, so we'll have to do it."

Starke flushed. "But it isn't fair for you to take all the risk. Let's toss up a coin."

Larry shook his head decisively. "Nothing doing! It's my job. I took you from the *Helios*, and it's up to me to see that you get safely back to earth or Mars. I stay."

With reluctance that poorly concealed his relief, Starke agreed. "We shouldn't do it," he said, "but if you insist—"

"Okay, get ready to go. I'll want one of the rocket pistols; and when you leave, don't close the outer airlock door. Move fast when the time comes. That's all."

Marcia was silent. She knew nothing she could say would deter Larry, but her heart rebelled against his giving his life for theirs—for hers! She watched him don his helmet through a blurring mist of tears; began putting hers on mechanically.

Quickly Larry shook hands, gripping Marcia's fiercely; then he crossed to the door—and was gone.

For a moment there was no change, the roar on the wall continuing unabated. Then Marcia caught a glimpse of Larry dashing away in gigantic leaps, a swarm of the metal projectiles after him. The clattering din began to diminish, and in a short time had almost ceased.

They watched until Larry vanished below the near by horizon of the little world. Then they hurried through the airlock, leaving the second door ajar. They were met by several hundred of the little cylinders which immediately attacked them; but they blasted these into slag with the remaining pistol, and reached the space-car without mishap.

A minute later they were seated in the control room, and the little craft roared into space, bearing them toward Mars—and safety.

H. C. MACDONALD'S unruly gray hair bristled angrily as he entered the control room of the express cruiser *Vulcan*. His rugged features were set in an expression of stern relentlessness.

"Schneider," he addressed the pilot, "more speed—more speed! There's a lad out there on Ceres who saved my daughter's life. Stuck to his post and let Marcia and that young squirt, Starke, get away in his boat while *he* risked his neck! An'—an', by God, if you'll find some way to stop. D'you hear?"

"Yes, sir. But if I put on more speed, sir, our momentum will make it difficult to land when we reach the asteroid, sir."

"Momentum be damned!" MacDonald roared. "I want more speed; and you'll find some way to stop. D'you hear?"

"Very well, sir." Schneider crouched over the controls.

The *Vulcan*, almost empty of passengers, leaped suddenly ahead like a falling meteor. She literally tore through space, her rocket vents thundering—onward, toward Ceres.

Standing before the space chart, H. C. MacDonald fixed his eyes on the luminous speck that represented the asteroid. And in another part of the cruiser Marcia stared anxiously through an isol-glass window into the blackness, hoping against hope for the safety of Larry. But her heart was heavy, her face pale, her eyes glittering with unshed tears.

"Ceres ahead!" At last the welcome words rang through the cruiser. Skillfully Pilot Schneider manipulated the controls, sending retarding rocket charges from the nose of the *Vulcan*. At first there was no appreciable difference in their pace, but as the full power of the forward check-vents was applied, the cruiser slowed its headlong flight, and in a very few minutes floated almost motionless in space.

"We've done it, sir," Schneider announced quietly.

"I knew you would." H. C. MacDonald left the room to get into a space suit.

Through a powerful binocular the pilot searched the surface of Ceres for sight of the great fuel tank and the boxlike house—the refueling station. Back and forth across the little world he sent the cruiser, but nowhere could he see that which he sought. Finally he caught sight of a wide, shining metal plain blotched here and there with irregular masses of black. He let the ship sink toward it. A minute passed—and the *Vulcan* landed a hundred feet from the gleaming area. Within the cruiser everyone clustered at the windows.

Before them lay an irregular plain of Ceresian rock, blackened in spots

as by searing flame; in others, coated with metal, as though molten nickel-steel had flowed and splashed over them. There was no motion, nothing to indicate life.

"What—what happened?" H. C. MacDonald muttered.

Marcia shook her head dumbly, biting her lip in dread. What *could* have happened? For this was where Larry's home had been—she recognized the topography of the place. But the tank, the three buildings, even the wrecked fragment of the *Helios*—all were gone! Fused into metal to coat the rocks!

And Larry—where was he? And where were the little metal things? Perhaps they had . . . Marcia uttered a horrified gasp. Could they have done this, burning Larry with the refueling station, then leaving for their own world? She buried her face in her hands to shut out the thought.

"What is it, Marcia?" her father asked anxiously.

Sobbing, she explained. "And, dad," she ended, "I knew him at college—loved him there . . . And I—I love him now!"

"But—the drugs—"

Quickly she pressed her fingers over his lips. "That—that's past. I *know* he had overcome the habit—and I know he loves—loved me."

H. C. MacDonald swallowed an annoying something that rose into his throat. Awkwardly he patted the girl's shoulder.

"Maybe there's still a chance. You may be mistaken about what happened here. At least, we'll search for him."

Quickly he issued orders. Everyone on board was to start in a different direction and search for fifteen minutes. At the end of that time they were to return to the *Vulcan*, enter

the cruiser, move a few miles away, and search again—until they'd find him, or abandon hope. Each would be armed with a rocket pistol in case of an emergency.

Clamping on their helmets, they began their quest—Marcia and her father, Ray Starke, Martin Lyman, M.D., the four members of the crew, including Schneider, and an official from Mars. Slowly they moved about, their eyes fixed intently on the ground.

At the end of fifteen minutes Marcia returned with downcast heart. She had discovered nothing. And her father, she saw, had had no more success. Nor had the others, already assembled about the cruiser. But suddenly she caught sight of Schneider; and—and he was bearing something in his arms!

Wildly she raced across the rough plain, running, leaping, soaring, and tumbled through the airlock after the pilot. The rest followed hastily; and the door was closed behind them.

They looked anxiously at Larry Darnmore, lying limply in the pilot's grasp. He seemed lifeless. His space suit was badly battered, and its legs had been charred and warped by intense heat. Marcia MacDonald repressed a choking sob, and despair crept into her eyes.

Gently Schneider lowered Larry to a pneumatic couch; as gently removed his helmet. As he did so, Dr. Lyman was discarding his own cumbersome space suit; then he removed Larry's. In the midst of this procedure Marcia brushed past him, slipped her arm under Larry's head, and looked pleadingly into his white, drawn face. His eyelids flickered open, and he ventured a faint, painful smile.

"Marcia," he whispered.

Dr. Lyman drew her away. "He needs immediate attention, Miss Mac-

Donald." He bent over Larry and gave him a quick but thorough examination. "Hmmm," he mused, "apparently there aren't any broken bones, at any rate." He held a stimulant to Larry's lips.

"No, doctor," he said slowly, after swallowing the liquor, "I'm rather badly burned about the legs, I believe, and my back seems somewhat bruised—and that's about all." He clenched his teeth for an instant to check a spasm of pain, then continued: "When the little projectiles chased me, you see—or maybe you don't see—I doubled back toward the house to make a stand there. But they were too much for me—I saw I couldn't make it. Then I got an idea—a wild one—but decided to try it. Jumped for the top of the fuel-gas tank, and reached it safely. The little things followed. When I was sure they were all there, I opened the pressure vent at the top, let some gas escape—and risked everything on one long chance. It took perfect timing—but it worked.

"Jumping backward with all my strength, I aimed at the opening with my pistol and pressed the trigger. The rush of flame caught my legs—and the little projectiles—but the explosion saved me. I felt myself spinning through empty space—then I woke up here."

He stopped, his face distorted by pain despite his efforts to suppress it. Noting this, the doctor said:

"You've said enough, young man. Your injuries aren't actually dangerous, but you must be suffering terrible pain. I'll give you something that'll ease it in a jiffy."

From his case he drew a hypodermic syringe, a vial of sterilized water, and a bottle of little white tablets. After putting a proper amount of water into

the syringe, he added a single tablet, let it dissolve, then returned the plunger to the glass tube. "A little morphine will do the trick," he smiled.

Marcia stepped forward impulsively, a hand raised in protest; but when she saw Larry's face, she paused. His expression was queer; it defied analysis. Eagerness was there, and pain—but that was not all.

As Dr. Lyman approached with the instrument poised, Larry stretched forth impatient fingers. "I'll take it, doc," he said in a low, vibrant voice.

For endless moments he studied it as it lay in the palm of his hand. There was no sound save the unconsciously heavy breathing of those who watched him. As a demon of pain gripped him, his hand closed—then opened again. And Larry Damore, with great deliberation, pressed the pistol of the syringe and sent the drug hissing through the air.

"I don't need that stuff," he said, quiet triumph in his voice, "don't want it. I'm man enough to stand a little pain, I believe." He returned the hypodermic to the doctor.

"Get ready for the trip back to Mars—or earth. I can stand it this way!"

"Larry!" Suddenly Marcia awoke from a stunned silence. "Larry!" The single word was a song of joy. An instant later their arms were about each other, and her smiling lips met his in a long, glad kiss.

H. C. MacDonald cleared his throat. "The lad pulled through," he murmured huskily.

LARRY DAMORE and the Outpost on Ceres—in the annals of the E. V. & M. the two are inseparable. For Larry was the first and only man to be assigned to that lonely little world.

Several months after his safe return to earth, scientists announced the successful construction of an atomic energy motor. This resulted in the abandonment of rocket-propelled ships, and in the installation of atomotors in all space cruisers. The emergency refueling station was no longer needed.

The projectiles from Vesta? The few that escaped—if any did—must have fled back to their own world. An expedition that visited the asteroid with the intention of destroying its life, returned with its mission unaccomplished. They decided that to blot out the worm-beings would have been

an unnecessary cruelty. They were not hostile to their visitors; and because of their minute size, they could hardly constitute a menace to anyone on Earth, Venus, or Mars. They had probably considered the buildings on Ceres to be an encroachment upon their own group of worlds—and had resented it.

Larry Damore? At first they made him an astro-technician, because of his interest in astronomy. But eventually he became a power in commercial space travel—H. C. MacDonald's assistant. After all, as the son-in-law of the big boss, he deserved *some* consideration.

THE END

Science Questionnaire

1. What is the etymology and meaning of the word analysis? (See Page 9)
 2. What are two leading methods of chemical analysis? (See Page 10)
 3. What is the etymology and meaning of the word synthesis? (See Page 12)
 4. When air supports combustion, is it analyzed or decomposed? (See Page 13)
 5. Describe a queen-bee mailing cage. (See Page 46)
 6. What is the process of giving a new queen to a hive of bees to replace an old one? (See Page 46)
 7. What is the rule about the single queen in a hive? (See Page 47)
 8. What is done with an old queen when a new one is to take her place? (See Page 47)
 9. What is "balling"? (See Page 47)
 10. What is nectar? (See Page 49)
 11. What is the drone? (See Page 50)
 12. What is royal jelly? (See Page 50)
 13. What is the average life of a working bee? (See Page 53)
 14. What is the approximate population of a hive? (See Page 53)
 15. How does a queen bee mate? (See Page 59)
 16. What is propolis or bee glue? (See Page 61)
 17. What are queen-cells? (See Page 64)
 18. What is the distinction between the words "octopod" and "dekapod"? (See Page 83)
 19. What reason is there for believing the moon to be uninhabited? (See Page 94)
 20. What are the names and characteristics of the moons of Mars? (See Page 95)
 21. Which is the largest of the planetoids? (See Page 121)
 22. What is the better name, asteroid or planetoid? (See Page 121)
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DISCUSSIONS

In this department we shall discuss every month topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the stories appearing in this magazine.

A Severe Letter, Perhaps More So Than We Deserve

Editor, AMAZING STORIES:

I really cannot say that I was entirely pleased with your February, 1936, issue. However, I feel that is excusable in some measure, for, by the law of averages, which states that everything has a bad slip sometime, you are bound to have a poor issue now and again. (But do not keep it up!)

It was a surprise (ironic) to see the advent of the long-awaited "The Maelstrom of Atlantis" by Joe Skidmore. It is a good half-year or more, Editor, since you promised that the story would be published soon. But, perhaps, waiting improved our taste for it, who knows? I found it very interesting.

"21931" by Keith, was very well written. It had a well-knit, smooth-running script.

"The Lurking Death" by Dr. W. Rose, and "When the Top Wobbled" by V. Endersby, were passable, with the former another well-knit story.

"Stroheim" by J. Brooke, and "We of the Sun" by an old author, Kostkos, were both interesting, the first from the fact that great minds can be human, the second because of the newness of plot.

"Hoffman's Widow" by F. Oles, was distinctly out of place in a magazine titled AMAZING. (Now, Mr. Editor, don't start up to say, "I thought——," the readers know the rest all too well. Sometimes I feel that the notes at the bottom of the letters are written by robots who can not think for themselves, but must write the same thing over and over with slight variations.)

And now a few brickbats. At times, Mr. Editor, you are rather an enigma to me. You seem to have the fickleness of mind usually attributed to the female sex. Let me cite an example. Back in 1931-2-3 you would claim that you were overstocked with stories and then contradict yourself by the sporadic publishing of the Quarterly. You have handled the publication of the mag. here in Canada in rather a lackadaisical manner, for which I cannot forgive you. After arranging the publishing in a near regular manner you suddenly stop without rhyme

or reason, at least as far as I could see. It appears as though I missed 3 issues through this blundering. And now, to crown it all, you begin publishing the magazine once every two months—adding insult to injury. Have your funds, sales and what-not fallen to such a low ebb as to warrant this?

And, Editor, please, whatever you do, don't jump around like a headless hen (as you seem to be doing) in marshalling your defense as to what you have been doing to "OUR" mag.

Will AMAZING STORIES return to the monthly publication again?

C. HOWES,
397 Davisville Ave.,
Toronto 12, Canada.

(Even in writing to a defenceless editor a little less harshness would be appreciated by the robot who answers this. You know perhaps what the mate on a whaling ship, who had a row with his captain, said: "All I want is a little common civility and a little of that." That is the way our robot feels. As you have objections to "Hoffman's Widow," we give here a letter a little more recent than yours on the subject of that story. Nothing in your letter incites our robot to indulge in saltatory exercises. We are hoping before very long to return to a monthly issue. The change in the Canadian Customs is responsible for the irregularity you complain of. After this, now that the change is settled and details arranged by the Canadian government you should have no trouble in getting your magazine regularly.—EDITOR.)

A Letter Inspired by the Story, "Hoffman's Widow"

Editor, AMAZING STORIES:

I am writing this letter to let you know that I enjoy A. S. more than any other magazine. And I especially liked "Hoffman's Widow" by Floyd Oles, in the February number, as this story carries the vividness of the Aleutian Islands, America's frontier against Japan. I have been up there and would like to see more stories about that country to put it before the American pub-

lic, regarding naval and air bases for defense.

GEO. GALE,
Box 93,
Golconda, Nevada.

(This letter is of special interest to the writer of these lines. He took the tourist trip to Alaska, but missed what would have been a most interesting experience, a visit to the Aleuts. "Hoffman's Widow" is a good study in the ways of a most interesting race—it is a good study in ethnology. The quiet determination of the Esquimau has been brought out in recent literature and some time ago on the screen. We highly appreciate your letter.—EDITOR.)

The June Issue of Amazing Stories Highly Approved of

Editor, AMAZING STORIES:

Good work on the June issue! Keep it up, please.

"Luvium Under the Sand" by A. R. McKenzie was especially good. The poem "Science and the Saucepans" by Julia Boynton Green was a pleasant bit of reading.

The Science Fiction Advancement Association is doing its part to spread science fiction and that, I hope, is indirectly helping AMAZING STORIES. Any one desiring information about the SFAA or wishing a free copy of our club bulletin "Tesseract" may have same by writing me, a postcard will do.

I'm eagerly waiting for the last installment of "Beyond the Stratosphere" by William Lemkin, Ph. D. I don't read serials until I get the whole works complete.

Very sincerely yours,

C. HAMILTON BLOOMER, JR.,
Managing Secretary, SFAA,
434 Cuerrero Street,
San Francisco, Calif.

(Many thanks for your appreciative letter. We considered the poem you refer to as especially amusing and well versified. There wasn't a word about Yeast in it. That fad of dieticians was left out of it.—EDITOR.)

The Artistic Views of A Very Young Reader Editor, AMAZING STORIES:

I am 11 years old and I read your magazine and enjoy it very much, except that I have a few suggestions (not brickbats). 1. The inside illustrations are all right except that Morey does not choose the right part of the story to illustrate. I am sure that if Morey read the stories more carefully he would find more exciting parts to

illustrate. The same goes with the cover. Well, now I'll sign off.

LELAND SAPITO,
295 S. Hill St.,
Pasadena, Calif.

(We publish this letter of criticisms with pleasure, because it is an example of how well a young reader can put his case on paper. It is a criticism with which we do not agree. But as it was once put by a delinquent of English cockney dialect, "Thoughts is Free." So while you scold us (in a very nice way, we admit) we have to to compliment you.—EDITOR.)

Are We As Bad As All That? We Do Not Believe It.

Editor, AMAZING STORIES:

Please understand that I do not write this letter merely to see my name in print, but to present some possibly helpful criticism of your mag. Aha! thought I was going to toss you a few roses eh! Well not this time.

Bah! I can truly say you run the poorest mag (stf) on the market. At this moment there lies before me on my desk the poorest issue of a stf mag ever printed. Yes, you guessed right, it's the February issue of AMAZING STORIES. The only decent story (that is, halfway decent) was Skidmore's serial "Maelstrom of Atlantis." "21931" and "When the Top Wobbled" were readable, but nothing to brag about. Of all the lousy hackneyed &x? —%— \$+—"** I ever read "Hoffman's Widow" was the worst. (You also charge the most exorbitant price of any stf mag issued.) I would also advise getting someone to give Morey some competition. (Say where does the science come into being in "Hoffman's Widow"?)

The April issue of AMAZING was better than the preceding issue but that isn't saying much! The above sentence may serve as my criticism for Morey's cover. "Intelligence Undying" was too general, it should have been developed in more detail. However "A Modern Comedy of Science" was quite amusing and also the best story in the issue. I have enjoyed all the Professor Jameson series but was sadly disappointed with this last one. The "Pygmies of Phobos" was also enjoyable, and it fairly shouts for a sequel.

Please continue giving us only two and three part serials, because we simply cannot read them. You could take up the suggestion given by several readers before this, (I mean issuing a quarterly or even a semi-annual issue.) Probably since one of your competitors came out with trimmed edges you have been deluged with requests for the same, so here I must make the same request.

To those of the readers who can't stand reading letters from these so-called "cranks," let me remind them of those other agitators who were unsatisfied with labor hours and wages; they made it possible for us to have the benefit of their work. You'll also wish to ask me why I continue buying AMAZING; well the only reason I can see is that I always hope to see a marked improvement in each new issue and also to have a completely filled stf library.

Until AMAZING again tops the list of stf, I remain, (probably for ever)

E. R. NOYVERE,
3021 Laconia Avenue,
New York, N. Y.

(The heading we have given this letter expresses our views. You say you remain—probably for ever.—You will not remain as long as that. None of us do.—EDITOR.)

Another Pleasant Letter from England, With Suggestions Under Existing Circumstances Not Very Applicable

Editor, AMAZING STORIES:

After reading your magazine for several years, with a great deal of enjoyment, I have decided that I would like to write to you and air one little grievance.

The only thing that I can complain of is the very large amount of space devoted to serials. In a magazine such as yours even one serial is not really necessary, as its only purpose is to make the reader continue purchasing his copy from month to month, and you readers obviously go on buying the magazine month after month whether you have an interesting serial or not. Even if you feel that it is necessary to run a serial, surely it is a little too much to have two in the same issue. In one issue which I have just read there were two serials which took up more than half the total text matter.

The controversy which seems to have gone on for years, about the quality of the paper used is not really important to one who buys the magazine for the matter it contains and not for the presentation of that matter, although I will admit that a slightly better grade of paper would make the text a little easier on the eyes. One point which you seem to have overlooked is that if you used an art paper you would be offering a better opportunity to advertisers, and if an advertiser felt that a paper was going to reproduce his blocks in a clean and attractive manner he would be more disposed to use the paper. At first sight this would not seem to have much to do with the reader but it is obvious

that if you received more revenue from your advertisers you would be able to spend the extra money on making your magazine even more attractive to your readers.

One other thing before I close. I would be very glad to hear from any readers in England or America who have old copies of your quarterlies for sale. It seems impossible to purchase these here nowadays, and if any of your readers have some that they wish to sell I would be very pleased if they would let me know how many they have and what price they are asking for them.

I thank you for the enjoyment which your magazine has given me in the past.

JOHN SULLIVAN,
6 Bryanston Street,
London, W.1,
England.

(We are trying to keep the serials restricted to a certain extent, but some are so good that we do not like to reject them. But we are trying to keep the serials down to two parts. You will probably hear from some of our readers in response to your query.—EDITOR.)

At Last a Letter Standing Up for the Editor Editor, AMAZING STORIES:

Perhaps I am in error, and not quite up to date on my astronomy, but the latest information I have had on the number of planets in our solar system is nine. They are, perhaps, not in correct order, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, and Pluto. The latter was discovered some three or four years ago, by an obscure astronomer in western United States, if I remember correctly. For that reason I was greatly surprised to find a reference to the eight planets of our system, not only in "When the Meteor Struck," but also in the editorial of the June, 1936, issue.

Has the discovery of Pluto been found to be an error or a fraud? If such is true I would be glad to learn of it. If it is not, I would like to know how it is that people who are in daily contact with scientific facts and knowledge common to many not even interested in science could have made such a slip.

I have been a friend of AMAZING STORIES since August, 1928, when I was introduced to "Skylark of Space." Although I am not as frequent a reader as I formerly was, I enjoy renewing my acquaintance from time to time.

When I read some of the brickbats thrown at you by various readers, who have no

idea what an editor has to go through in preparing each issue, I feel sorry for you and for them. Their ignorance may be blissful but it sure is a nuisance more than anything else. I still remember that exceptional novel "Islands of Space" by Campbell, "The Ice Man" and "The Sunken World." Many of your readers, who now endorse the comet-tail title, apparently were not acquainted with the magazine at its beginning. I am glad you have returned to it. Now I can spot it from quite a distance, and if I see a copy I buy it. Good wishes to you. May you retain that fine sense of humor, which displays itself often in the "Discussions" columns. I hope the day will come when science fiction is recognized fully as having a definite message to bring to this, the third planet of nine. With which parting shot I say au revoir.

JOHN LONDON,
The Beacon Inn,
Robertson, Mo.

(Do not be too sure that we are the third planet of nine, there may be more on their way. It is not very long since Neptune was discovered. The striking thing (no pun intended) about brickbats is that what one correspondent attacks another praises. —EDITOR.)

A Letter of Criticism from an English Correspondent.

Editor, AMAZING STORIES:

I'm taking advantage of the invitation you gave me to write again; whether or not this will see print is another matter. This is going in parts to be a candid letter, and if you censor it, that will be just too bad. However I hope you won't, for you ought to publish all criticisms in full (unless of course they are absolute poison-pen affairs, in which the ancestry of everyone remotely connected with AMAZING STORIES is frankly questioned). I've dilated before on your habit of censoring letters, and I would like to say that far from being harmful, the printing of a severely critical letter is usually followed by such a rallying of indignant loyalists as pushes the circulation up 100%. Of course if the letter is not printed because the criticism in it only too truly hits the mark, you know who is solely responsible for such a state of affairs.

Now for you, Editor. Much as I would like to berate you for going bi-monthly, I realize that it would be unreasonable to do so. Times are hard I realize and I make allowances, but there are things which lie in your power to better. You know very well that all other magazines can print letters criticizing, say the March issue in the May

issue. If then it takes only two months to see a letter in other magazines, I should be able to see letters concerning the last issue in this month's AMAZING STORIES, since you are bi-monthly. But, no. Four months is the minimum. With luck I shall see this letter, which I am writing in late May, some time in December. By then vital points in it (if such there be) will be utterly changed by the passage of time. Do something, please. You can if you will. If you don't, I fear it will be just another of those little irritating matters, which nevertheless play a big part in turning readers from AMAZING STORIES to other books, which cater a little better for their readers I hope you realize what we (and I don't mean I) think of your publishing "Hoffman's Widow." If you think that, tired of science-fiction, we welcome such a straight story, I fear you're wrong. There are so many sources of straight stories, and so few of science-fiction, that we don't want the first increased at the expense of the last, even if the offender is a story worthy of the "Atlantic Monthly." We buy AMAZING STORIES because, by name alone, we expect AMAZING STORIES and none other. If we want adventure fiction we'll buy adventure magazines, but if we don't want adventure fiction, we don't expect it to be thrust on us in a science-fiction magazine. Yes, I know what you are going to say, you don't buy books off newsstands and fail to see my point. Reverting to the letters in the June issue, I notice someone, I think it was Gene Noguere, raised just the two points that I have done, re delay of letters and "Hoffman's Widow," reason for printing of same. If it matters at all you are thus "doubly damned." Someone also said that few familiar names now appear in "Discussions," meaning I suppose that those big guns or triple-course rays, that used to write in, don't bother now. A sad fact but true. Why is this and is there any remedy? Well it might be that they have either grown away from AMAZING STORIES, or that AMAZING STORIES has grown away from them. If the former it means that their career as science-fiction devotees is finished, and that they have tired of science-fiction and have lost interest in it. If that was the case we are well rid of them. for they were never true devotees, as the latter never quit the subject. As the carbon monoxide victim said "It's in the blood for life." Science-fiction is too fine a thing in its best phases, to merit abandonment.

So the alternative we are left to consider is that AMAZING STORIES has gone away from the veteran Science-fiction readers. And what can that mean? What can that mean, but that AMAZING no longer caters for them?

And there we have the problem in a nutshell. You do not cater for the veteran reader of science-fiction. Stories which are new to him, not necessarily new in plot, but merely sufficiently new in development and sufficiently logical to make him say "That is a different story" are all too rare in your pages. Some you do publish, I know, but the great majority of your stories are aimed at the comparatively new and uncritical reader. That they are read by many very intelligent people only goes to show that you are hardly catering for every taste. I realize that you give us what you think we like, and emphasize for that reason the adventure "science-fiction" story, but after a while even new readers tire of "Wild West" science fiction, and the big thing is not to get readers' interest but to keep it.

I won't say anything more about that, because the June issue is much above average. One story, "Luvium under the Sands," illustrates perfectly what I mean by saying that a story doesn't have to have a new plot to go over big. What basically is new in an American discovering an underground kingdom, which he frees from tyranny and whose princess he marries? Yet a few deft touches, novel situations and above all, snappy dialogue, that *sine qua non* of a good action story, and you have a story that makes me say "If you'll only continue printing such stories, one per month, I'll take back all I said."

Maybe I have been over-critical, but if anyone wants to answer back, let him write to my home address—and that goes for anyone else who'd like to write. Now, Editor, I feel better. Good luck.

SYDNEY L. BIRCHBY,
38 Nightingale Avenue,
Higham Park, Essex, England.

(A portion of this interesting letter has been omitted. It referred to the artist, Mr. Morey. We are going to try another artist, and if acceptable we hope he will please all.—EDITOR.)

A Pleasant Letter from an Australian Boy.
Our Discussions Have Helped Him Already,
We Hope the Letter Below Will Have Good Results

Editor, AMAZING STORIES:

I have just received the October issue of A.S., 1935. In reading "Discussions" I saw to my great joy that I had at last had a letter printed. I don't know whether I am feeling conceited or not, but I reckon that issue was the best I have ever read. The other day I received a parcel of A.S. from an American "pen" with whom I became associated through your magazine. Two of

these books had in them, "Planet of the Double Sun" and its sequel, we have not got too many stories of this type lately and I am going to start to—well, doing things, if you do not start printing them soon. By the way, what has happened to Professor Jameson, is he still fooling around on Lov or has he been taken apart by the savages? When do we get another story about his further adventures on Lov? In closing this letter I would like you to publish the following. Anyone wishing to sell back issues of science-fiction, please send me a price list, giving full particulars such as price of the magazine including postage to Australia. I would also like boys of my own age (15) to write to me with a view to exchanging things of interest to each other and also to exchange ideas about Sci.

I also have all the numbers that were ever issued of "Scoops" (20 in all) on English science-fiction magazine, which flourished in 1934, which I would like to exchange for A.S. or Fantasy magazine.

JOHN GREGOR,
25 King William St.,
c/o Commercial Bank,
Adelaide, South Australia.

(It is a comfort to get such nice letters as this is. Australia always treats us nicely. We often wonder what fortune our "Discussions" correspondents have in acquiring "Pen Pals" and here you tell us of your success. Professor Jameson was all right the last time we heard from him.—EDITOR.)

Pen Friends Wanted by a New Zealand Correspondent. We Believe It Is a Lady Who Writes Us

Editor, AMAZING STORIES:

I have been a reader of your magazine for several years now and enjoy the stories very much.

I wonder if you could help me? I should very much like some pen friends in America about 30 years of age interested in outdoor life and all sports generally.

Thanking you in anticipation and wishing you the very best of luck.

BARBARA ASTON,
310 Clifford Street,
Gisborne, Poverty Bay,
New Zealand.

(We publish your letter with pleasure and wish you success in finding an interesting correspondent in this country. Please write and tell us what success you have had in your search for such a correspondent.—EDITOR.)

Some Notes on Science-Fiction Study and Reading.

Editor, AMAZING STORIES:

For the past five or six years I have been a serious-minded reader of this form of literature, and an ardent admirer of the very great progress which is being made in the many different phases of science and scientific experimentation. I am penning this letter primarily for the purpose of presenting to the readers of this publication if you will enable me to do so by publishing it, my personal concept as a reader of science-fiction, of the value of science-fiction to the advancement and progress of science in general. I think it will be of general interest to the readers and am in hopes that it will stimulate a desire on their part to criticize and advance opinions of their own in regard to the subject I am about to discuss. I consider the "Discussions" department of *AMAZING STORIES* magazine a splendid medium through which the individual reader is afforded an opportunity to express his personal opinions and viewpoints on all matters pertaining either directly or indirectly to science and science-fiction. Any person who has a knowledge of the basic principles and cardinal fundamentals of all the more important divisions of scientific endeavor, is, I believe, eligible to form a logical viewpoint of his own concerning the relation of science-fiction literature to pure scientific research in the world of today, and in the world of the distant future. It is only logical to presume that many of the now fictitious narratives which appear upon the pages of this and similar publications will some day attain full and absolute realization. When we take into consideration the fact that science has already performed marvels in chemistry, physics, medicine and specialized astronomical research work, we must admit that what is extravagant fiction today may be pure reality tomorrow. In full view of the fact that science is almost annually discovering new truths and making startling revelations in various of its diversified phases, it would seem that the word "impossible," as applied to scientific attainments, can no longer be found in the dictionary. If I were to write an editorial relating to this type of educational literature I would do my level best to convince skeptical persons as to the major importance of science fiction narrations and articles. I would then endeavor to instill into the minds of these unbelieving persons, a desire to form an association with such literature. It should not be difficult for any scientifically minded person to realize the true value of such literature to the development and furtherance of knowledge. We have only to

cite a few examples of the past in order to bear out the statements which my letter contains. In order to exemplify these statements permit me to give you three concrete examples.

I. Jules Verne, celebrated creator of science-fiction, wrote a number of fascinating novels pertaining to futuristic scientific achievements, foretold some of the most astonishing accomplishments in the world of pure science. His book entitled "Twenty Thousand Leagues Under the Sea" heralded the coming of the submarine and deep-sea exploration. Do not forget the fact that when the book was written the submarine was little more than a dream. This dream however materialized with the invention of the first practical under-water craft.

II. His book entitled "Around the World in Eighty Days" heralded the record breaking flight of the late and courageous Wiley Post, who in a monoplane spanned the world in seven days. Here again we find science-fiction being converted into pure reality. And although Wiley Post's flight around the globe was somewhat different from the voyage of the characters in Verne's book, it bears out essentially the same principle—an increase in speed to demonstrate the progress in speed which is made and which for that matter is being made still by man.

III. Verne's novel captioned "Five Weeks in a Balloon" announced the coming of extensive traveling in dirigibles and also of ascensions into the stratosphere to make observations miles above the surface of the earth. Here again we have an even greater conversion of fiction into cold reality, for we are now moving very gradually but surely in the direction of futuristic interplanetary travel and the establishment of communication between the earth and certain other planets of our immediate solar system.

And here is another point which might be considered in this discussion of the relation of science-fiction to the progress of pure science in various of its phases and ramifications. Before the invention of the microscope who would have dreamed that a single drop of water contains millions of individual microscopic organisms, moving rapidly from place to place performing specialized functions of their own, and as fully ignorant of our existence as we of theirs. If writers of science-fiction had lived in those days, years before the advent of the first microscope, many interesting facts might have been conceived of in connection with the unseen world living in a single drop of water. If such writers had lived in those days and if they had written on the

subject, how soon their so-called fantastic stories would have materialized in the light of latter day knowledge obtained through investigations into the unknown, conducted with the microscope.

A magazine like "AMAZING STORIES" is exactly the forerunner of all future developments, achievements and experimentation in the world of scientific endeavor. And this type of literature as presented in the pages of a publication like AMAZING STORIES, tends not only to broaden the mind of the individual reader, but also to improve upon his education and to widen and extend the scope of an outlook which would otherwise remain narrow and warped. And to what do I attribute the increasing popularity of science-fiction narrative? The answer is a very simple one. I attribute this popularity to the fact that magazines and periodicals like AMAZING STORIES have a strong magnetic characteristic, which reigns supreme and exalted above all other forms of literature. In the "Discussions" section of AMAZING STORIES I have many times seen letters from England, Australia and other parts of the world, proving that the number of persons who find this a desirable and educative as well as entertaining form of literature is slowly but steadily increasing, proving that there are many heretofore uninterested persons who are now developing a strong interest in it, and who are becoming conscious of the fact that science-fiction narrations are playing an important role in the great drama of the progress of science. As an educational organ science fiction is rendering a splendid service in the presentation of literature, which is devoid of technical, scientific phrases, which might confuse the reader and cause him to lose interest in the matter under discussion. Personally the information which I have derived from the reading of this and similar publications has furnished me with valuable material on science in general and has enabled me to prepare a few minor science discourses, which I shall soon have the good fortune to deliver to a small but appreciative group of science-minded students, who are now engaged in the study of general science in a leading university. I have listed below my reasons for believing that this type of educational literature should be read by all intelligently thinking, scientifically minded persons who are desirous of obtaining knowledge of value, and an insight into the mechanism of the world of science. It has the unexcelled quality of being both entertaining and educational. It is really the forerunner of all future scientific development and revelation. I consider science-fiction to

be a very desirable form of literature because it is clean.

FRANK C. DAUNBACHER,
253 Senator St.,
Brooklyn, N. Y.

(This letter is so well thought out and its topics so fully expressed that no comment is necessary. Certainly good science fiction is a great advance on only too much of the prevalent literature of the day. We are trying to hold it to a high standard, a task not always an easy one.—EDITOR.)

A Reader Who Objects to the Story "Hoffman's Widow." We Liked It.

Editor, AMAZING STORIES:

Personally I am a warm hearted supporter of AMAZING STORIES, though the stories should be better in general, as long as Neil R. Jones, David H. Keller and Doctor E. E. Smith contribute from time to time such classics as the "Jameson series," "Life Everlasting" and "Triplanetary." I shall continue to read this magazine. While as I say I heartily approve of your magazine, I am not so fanatical as to condemn critical letters. No magazine should stagnate especially AMAZING STORIES, "The Aristocrat of Science Fiction." Letters from readers are the only medium for the transmission of ideas to the Editor. Editors honestly want satisfied readers. And if readers are dissatisfied the editors want to know why. I believe that readers who are wholeheartedly in favor of AMAZING STORIES should encourage critical letters for the sake of the Magazine's improvement. Whatever may be AMAZING's faults, weirdness is not one of them. Such excrescences, if you'll pardon the term, as "Hoffman's Widow," are conspicuous because of their rarity. The Magazine reflects, the moderation of its editor; this is a guarantee of scientific science fiction in AMAZING STORIES. Mr. Fearn's letter is almost as interesting as the story he is defending. Mr. Fearn's charm lies in his superb fiction. You have wisely set aside your rule on logical science to publish "Liners of Time." This story is a sparkling jewel in AMAZING's glittering diadem. The greatness of such fiction writers as Poe, Verne and Wells rests in the excellence of their fiction rather than in their science. Any schoolboy could think up the plot of "Intelligence Undying." However it took Edmund Hamilton to write down that plot in an entertaining form. Mr. Fearn realizes that his stories are read by well educated people who won't stand for "pulp" writing. Pedants form an inconsiderable part of Mr. Fearn's readers. If I were a publisher and some unknown author presented,

me with a poorly written story, which embodied a startling original scientific story, I should pay the writer for his story and turn the central theme over to a writer like Doctor E. E. Smith. Published in the original form it would attract notice. In the revised form it would become a classic One can trust to Mr. Fearn's reader-psychology. Seeing "Labyrinth" in AMAZING augurs well for this magazine, when such authors as Neil R. Jones continue writing for it, I know that AMAZING is still worth reading.

ALAN J. EISENSTEIN,
841 Academy Road,
Woodmere, N. Y.

(It is fair to say that this letter is especially interesting, because, while the writer of it does not like "Hoffman's Widow," he does like AMAZING STORIES. Perhaps it will be called vanity, but it is the greatest pleasure to the editor to feel that his work upon the magazine is appreciated even if some story is criticized unfavorably. And the aggravating part of it is that it may be a story we particularly liked that meets with disfavor. And it is pretty weak to apologize for a story we consider very fine. Your letter is very good. We shall hope for more from you. EDITOR.)

A Letter of the Scolding Type. You May Remember the epitaph of the Western Ranger.
"He did his d—st. Angels Could Do No More." Editor.

Editor, AMAZING STORIES:

Although I have been reading your magazine for a number of years, this is the first time that I have ever written to you. I intend to use the usual method employed by most of your critics i.e., starting with the cover and working in.

To begin with, the covers are not bad, but they fail to depict ACTUAL scenes from the stories. The return to the old "Comet Tail" title was a great improvement.

Next we come to the editorials. Here I have no criticism to offer. They are interesting and entertaining.

The stories however are a great disappointment. About five years ago you published your best stories. Since then there has been a change for the worst. For instance, out of all the stories that you published last year the only ones that are worth remembering are: "Conquest of the Planets," "Liners of Time," "Earth Rehabilitators, Consolidated," "Fall of Mercury," "Space War," "Epos of Posi and Nega," "Legend of Posi and Nega," "Meteor Min-

ers," "Inference," "Relativity to the Rescue," "Another Dimension" and "The Symphony of Death."

I have just read the February issue and I want to say that it is a poor way to start the new year. I can not understand why you ever printed "Hoffman's Widow." There is not one bit of science in the story. "Maelstrom of Atlantis" looks like another one of these "Lost Atlantis Stories." "Stroheim" and "When the Top Wobbled" are both examples of hackwriting. The former deals with "the mad scientist who wants to control the world," and the latter deals with the much used "world-wide destruction" theme. "The Lurking Death" is another example of hackwriting. "We of the Sun" and "21931" were the best in the February issue.

Your best authors are Campbell, Jones, Keller, Skidmore, Kostkos, Hamilton, Williamson, and Olsen. Smith is your greatest author.

"Discussions" are very interesting and sometimes amusing.

I would like to make a plea for a return to the larger size. I also wish to state that I am in favor (if that means anything) of reprints. Why don't you reprint the "Skylark of Space." If the reaction is favorable then you can continue with reprints. If it is unfavorable then you need not print any more.

I am sorry to see that AMAZING STORIES has now become a bi-monthly. I hope that it is not permanent.

J. WILSON,
85-22, 155 St.,
Jamaica, L. L., N. Y.

(It was the condition of affairs that caused the change to a bi-monthly in the issuing of AMAZING STORIES. Perhaps there is a good time coming, as the old song has it. It is probable that "The Skylark of Space" may appear in book form.—EDITOR.)

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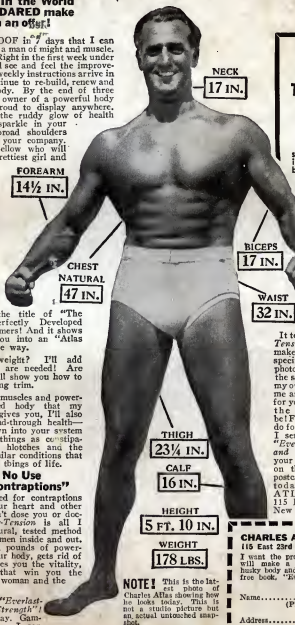
And with the big muscles and powerful evenly-developed body that my method so quickly gives you, I'll also give you thorough-and-through health—health that digs down into your system and banishes such things as constipation, pimples, skin blotches and the hundred-and-one similar conditions that rob you of the good things of life.

I've Got No Use At All for "Contraptions"

I haven't any need for contraptions that may strain your heart and other vital organs. I don't dose you or doctor you. *Dynamic-Tension* is all I need. It's the natural, tested method for developing real men inside and out. It distributes added pounds of powerful muscles over your body, gets rid of surplus fat, and gives you the vitality, strength and pep that win you the admiration of every woman and the respect of any man.

Get my free book, "Everlasting Health and Strength!" Mail my coupon today. Gamble a stamp to prove I can make YOU a new man!

MAIL COUPON FOR FREE BOOK NOW!



NOTE! This is the latest photo of Charles Atlas showing how he looks today. This is not a studio picture but an actual untouched snapshot.



This Sterling Silver Cup Being Given Away by

Charles Atlas

This valuable cup, made of solid sterling silver, stands about 14 inches high on a black mahogany base. I will award it to my pupil who makes the most improvement on his development within the next three months. Therefore, no matter what your measurements may be now, you have an equal chance to win this cup for permanent possession—and with YOUR name engraved on it!

Get my free book by mailing coupon below.

48-PAGE BOOK FREE

It tells you all about my special *Dynamic-Tension* method, and what it has done to make big-muscled men out of run-down specimens. It shows you, from actual photos, how I have developed my pupils to the same perfectly balanced proportions of my own physique. What my system did for me and these hundreds of others it can do for you too. Don't keep on being only half the man you CAN be! Find out what I can do for you. Where shall I send your copy of "Everlasting Health and Strength"? Put your name and address on the coupon, or a postcard, and mail it today. CHARLES ATLAS, Dept. 9J, 115 East 23rd Street, New York, N. Y.



CHARLES ATLAS, Dept. 9J

115 East 23rd Street, New York, N. Y.

I want the proof that your system of *Dynamic-Tension* will make a New Man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

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(Please Print or write plainly)

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Again... MIDWEST RADIO Proves Its Leadership!



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MARVELOUS NEW

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**FIVE WAVE BAND,
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ONCE again, Midwest demonstrates its leadership by offering the world's most powerful Super Deluxe 14-METAL Tube 5-band radio. It is a master achievement... today's most highly perfected, precisely built, laboratory adjusted set. It is a radio-musical instrument that will thrill you with its marvelous super performance... glorious new acousti-tone... crystal-clear "concert" realism... and magnificent foreign reception. Before you buy any radio, write for FREE 40-page 1936 catalog. Learn about the successful Midwest Laboratory-To-You policy that saves you 30% to 50%... that gives you 30 days FREE trial. This super radio will out-perform \$100 and \$200 sets on a side by side test. It is so powerful, so amazingly selective, so delicately sensitive that it brings in distant foreign stations with full loud speaker volume, on channels adjacent to powerful locals. The 14 tubes permit of advanced circuits, make it possible to use the tremendous reserve power, and to exert the sustained maximum output of the powerful new tubes.

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with New
**AUDITORIUM TYPE
SPEAKER**
(LARGE TUBES)
**EASY
PAYMENT
TERMS**

50 SENSATIONAL ADVANCEMENTS

Scores of marvelous Midwest features, many of them exclusive, explain Midwest glorious tonal realism, super performance, and thrilling world-wide 5-band reception. They prove why nationally known orchestra leaders like Fred Waring, George Olsen, Jack Benny, etc., use a Midwest in preference to more costly makes. Five tuning ranges make it easy to parade the nations of the world before you. You can switch instantly from American programs... to Canadian, police, amateur, commercial, airplane and ship broadcasts... to the finest and most fascinating programs from Europe, Africa, Asia, Australia South America... 12,000 miles away.

Acousti-Tone V-Spread Design (U.S. Patent No. 2,572,000)

The V-Front Dispersing Vanes established a new radio style overnight. They spread the beautiful lace-work of the "horns" throughout the room in a scientific manner... directing the High Fidelity waves uniformly to the ear. Now, get complete reserve of audile frequencies... achieving glorious new acousti-tone... ensuring life-like crystal-clear "concert" realism. No middlemen's profits to pay. You buy at wholesale prices, direct from Laboratories... saving 30% to 50%. You can order your 1936 Midwest radio from the new 40-page catalog with as much certainty of satisfaction as if you were to come yourself to our great laboratories. You save 30% to 50%... you get 30 days FREE trial... as little as \$5.00 down puts a Midwest radio in your home. You are truly protected with a One-Year Guarantee, Foreign Reception Guarantee, Money-back Guarantee.



Ted Wemy Enthusiast Over Foreign Reception

After receiving many radios, I am truthfully saying that my Midwest out-performs other sets, doing less almost twice as much. In all my experience, I have never heard such life-like reproduction. My Midwest surpasses all my expectations, and in my opinion, is the finest radio receiver obtainable."
— Ted Wemy.

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